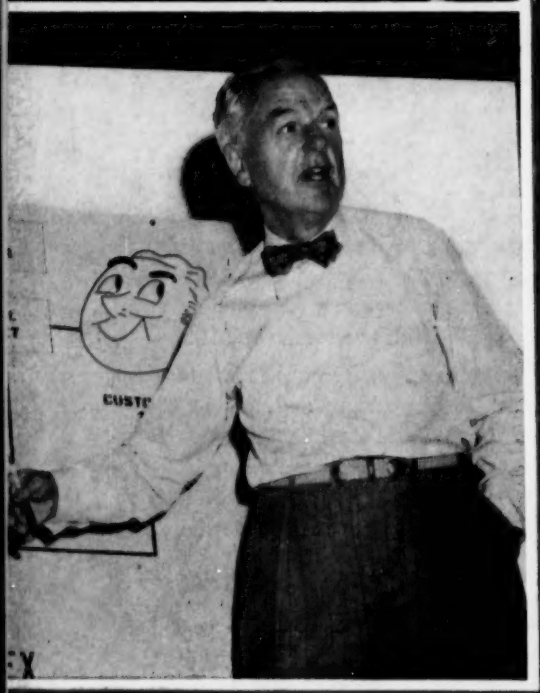
Chemical Week



A McGRAW-HILL PUBLICATION

See what you can do with the new textiles

They're weaving magic into modern textiles. Today, fabrics can be made stronger or softer, cooler or warmer, tougher or lighter, shrinkproof, mothproof, fireproof, waterproof, and almost foolproof. While it would be difficult to predict what the textiles of tomorrow will be like, one thing is certain—chemicals will make an even greater contribution to their improvement.

Working closely with textile manufacturers and finishers, Olin Mathieson offers invaluable assistance through a long-range program of *coordinated planning and production.* This assures the availability of chemical raw materials regardless of changing market conditions; assures adequate chemical production to supply growing industrial capacity; speeds the development of new chemical products and processes; provides greater flexibility in shipping and handling of materials; provides the personal attention of recognized product experts backed by widely diversified research facilities.

Currently, a growing number of chemical consumers are coordinating their planning and production with Olin Mathieson . . . America's prime producer of basic industrial chemicals. Olin Mathieson's long experience and familiarity with the broad market picture will prove invaluable in your planning. Why not consult with us *now?*

MATHIESON CHEMICALS

OLIN MATHIESON CHEMICAL CORPORATION

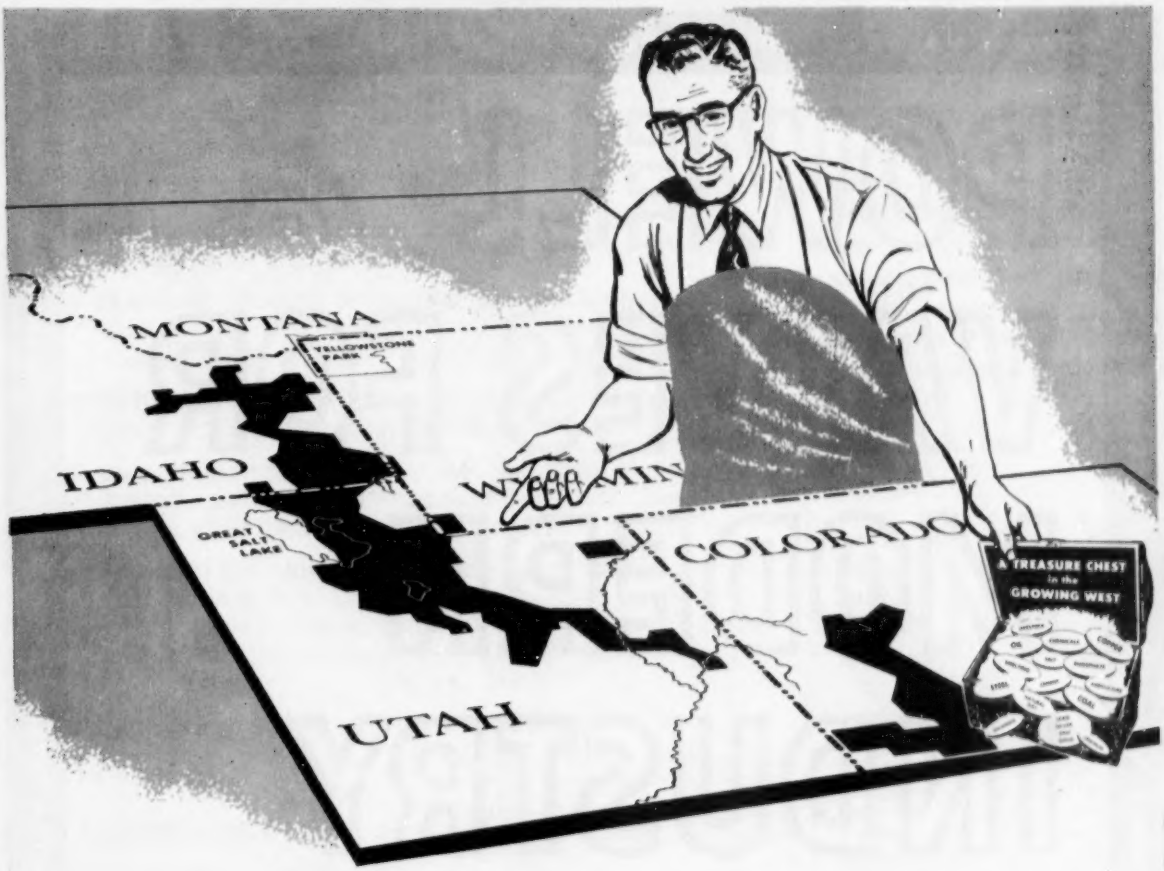
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

3300

MATHIESON

INORGANIC CHEMICALS: Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Soda • Chlorine • Hydrazine and Derivatives • Hypochlorite Products • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sulphate of Alumina • Sulphur (Processed) • Sulphuric Acid

ORGANIC CHEMICALS: Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichloroethylether Formaldehyde • Methanol • Sodium Methylate • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorophenol • Trichlorobenzene



This is Basic Source Land for the Great Chemical Age...

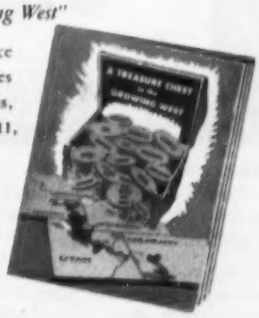
new--fresh--virtually untouched

- Every major basic raw chemical.
- 60% of U.S.A. phosphate reserves.
- 214 different minerals.
- One-third of nation's copper.
- Largest proved uranium reserves in the nation.
- Greatest concentration of non-ferrous metal mills, smelters, refineries in U.S.A.
- Largest steel mill west of the Mississippi.
- Low-cost power, water, fuel.
- Intelligent and stable labor force.
- Sound diversified economy.
- Healthful climate with low humidity.
- A gateway to the rich, far west market where America is growing fastest.
- Plus . . . plenty of "elbow room".

The catalog of raw materials occurring in "Treasure Chest" land—*mostly in enormous quantities*—lists practically every element in the atomic scale. Here in the vast Utah, Idaho, Colorado and Wyoming area served by Utah Power & Light Company, many well-known American firms have already begun to dig into new, fresh, almost unlimited sources of wealth. But they have barely scratched the surface. The potentialities merit the careful study of any industry seeking larger opportunity for today and the future.

Ask for copy of "A Treasure Chest in the Growing West"

Detailed information is presented in this Area Resource Brochure. Write, wire or telephone for a copy. Inquiries held in strict confidence. Address: W. A. Huckins, Manager, Business Development Department, Dept. 11, Utah Power & Light Co., Salt Lake City 10, Utah.



UTAH POWER & LIGHT CO.

A Growing Company in the Growing West

POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

. . . THE COMPLETE QUALITY LINE . . . POWELL VALVES . . . THE COMPLETE QUALITY LINE . . .

POWELL VALVES FOR MODERN INDUSTRY

FIG. 2193—Ni-Resist* Gate Valve for 200 Pounds W.O.G.

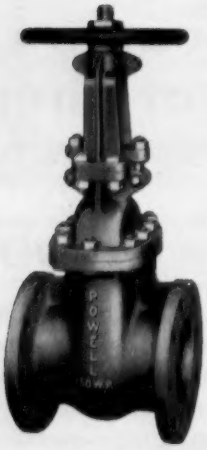
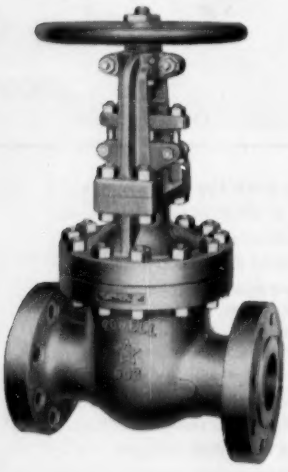


FIG. 2453 G—Stainless Steel O.S.&Y. Gate Valve for 150 Pounds W.P.

FIG. 6003 SS—Alloy Steel Gate Valve for 600 Pounds W.S.P.



*Trademark of The International Nickel Co.

POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

. . . THE COMPLETE QUALITY LINE . . . POWELL VALVES . . . THE COMPLETE QUALITY LINE . . .

When you think of valves—think of Powell. For Powell has a *complete* quality line. Powell probably makes more kinds of valves and has solved more valve problems than any other organization in the world.

Shown above are just a few Powell Valves. Investigate these valves . . . *and* the *complete* line of quality valves made of bronze, iron, steel, special alloys and pure metals.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our complete line, and help solve any flow control problem you may have. Write . . .

The Wm. Powell Company, Cincinnati 22, Ohio . . . . . 109th year

Chemical Week

September 24, 1955
Vol. 77, No. 13

TOP OF THE WEEK

Another round of aluminum expansion? The scurry for money, sites and power suggests it .....p. 17

The chemical process industries are backing their optimism with cash. Latest estimates of upcoming capital expenditures indicate solid growth ahead ..p. 18

Vacations are getting longer—sooner. You can compare your firm's policy with this cross-section .....p. 22

The pulp and paper industry will become a better and better customer for chemicals. Consultants Calkin and Frank valuate developments, chart the future .p. 44

Engineers on the sales team? Sure thing—and their contributions to Dow Corning's commercial development of silicones has won the firm the Chemical Engineering Award to be given next December .....p. 113

8 OPINION

13 NEWSLETTER

17 BUSINESS & INDUSTRY

19 Government warns oil importers to cut back on intake of cheap foreign imports. A precedent-setter?

19 Columbia-Southern makes new attempt to add certainty to production schedules via long-term labor contracts

20 Washington Angles

26 Mrima Hill in Kenya: treasure trove of rare earths?

28 Collecting marine specimens in Texas, novel public relations twist

30 Not pie-in-the-sky, but cash on the barrelhead; that's current goal of chemical strikes

34 Slowly but steadily, fluoridation gains nationwide acceptance

36 Chemical cases hang in the balance as FTC opens new term under political attack

63 PRODUCTION

Complex processing techniques play leading role in nuclear fuel production

73 Rayonier readies new ion exchange process of making pure lignosulfonates

79 RESEARCH

What to do about the researcher who can get more money from another company

84 Zone freezing is newest hope for economical sea-water purification

101 MARKETS

Market Letter

105 Naphthenate paint drier consumption is threatened by popular "do-it-yourself" emulsion paints

113 DISTRIBUTION

116 Borden is new vendor in fumaric acid field

119 Paper covers keep out moisture and impurities during rail transit

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Company, Inc. James H. McGraw (1860-1948), founder. Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Publication Office: 1309 Noble St., Philadelphia 23, Pa. Donald C. McGraw, President; Paul Montgomery, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice-President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Circulation Director.

Subscriptions to Chemical Week are solicited from management men in the chemical process industries. Position and company connection must be indicated on subscription order. Address all subscription communications to Chemical Week Subscription Service, 330 W. 42nd St., New York 36, N. Y., or 1309 Noble St., Philadelphia 23, Pa. Allow one month for change of address.

Single copies 35¢ except Annual Buyers' Guide issue priced at $2.50. Subscription rates—United States and Possessions $5.00 a year; $8.00 for two years; $10.00 for three years. Canada $6.00 for a year; $10.00 for two years; $12.00 for three years. Other Western Hemisphere countries $15.00 a year; $25.00 for two years; $30.00 for three years. All other countries $25.00 a year; $40.00 for two years; $50.00 for three years. Second-class mail privileges authorized at Philadelphia, Pa.

Copyright 1955 by McGraw-Hill Publishing Co. Inc.—All rights reserved.

Publisher Wallace F. Traendly
Editorial Director Sidney D. Kirkpatrick
Editor W. Alec Jordan
Managing Editor Howard C. E. Johnson

DEPARTMENT EDITORS
Business & Industry .... Jane H. Cutaia
Markets ..... Anthony J. Piombino
Production ..... Donald P. Burke
Research ..... Ralph R. Schulz
Specialties ..... J. R. Warren

Special Projects ..... Homer Starr
Reports ..... Michael L. Yaffee
Illustration, Format Donald R. Thayer
Copy ..... William Mullinack
Buyers' Guide ..... Robert N. Shaw

ASSISTANT EDITORS
Business & Industry ... Vincent L. Marsilia
Distribution ..... John M. Winton
Markets ..... Jorma Hyypia
Production ..... Kenneth Wilsey
Research ..... Joseph F. Kalina
Specialties ..... Charles Joslin

REGIONAL EDITORS
Midwest ..... Frank C. Byrnes, Chicago
Southwest ..... James A. Lee, Houston
West Coast ... Elliot Schrier, San Francisco

EDITORIAL ASSISTANTS
Virginia Clark, Kay Sebiry

NATIONAL NEWS
Economics .... Dexter M. Keezer, *Director;* Douglas Greenwald, Robert P. Ulin
Atlanta ..... William Kearns
Cleveland ..... Robert E. Cochran
Detroit ..... James C. Jones
Los Angeles ..... John Shinn
San Francisco ..... Margaret Ralston
Washington ..... George B. Bryant, Jr.
Correspondents in 73 principal cities

WORLD NEWS
Editor ..... John Wilhelm
London ..... Edward W. S. Hull
Paris ..... John O. Coppock
Bonn ..... Gerald W. Schroder
Rio de Janeiro ..... Peter Weaver
Mexico City ..... John H. Kearney
Tokyo ..... Dan Kurzman
Bombay ..... Gordon Graham
Correspondents in 44 capitals and principal cities

ADVERTISING STAFF
Advertising Director ..... Robert S. Muller
Advertising Sales Mgr. ..... Steven J. Shaw
Business Manager ..... Anton J. Mangold
Sales Promotion Mgr. .... E. A. Atwood, Jr.
Market Service Mgr. .... Adolph I. Losick
Sales Reps. ..... See Advertisers Index

Put This Plant Behind Your Product

Here at Publicker, we maintain that users of our products can no more afford to take chances with quality than we can. Consequently, every drop in every gallon or tank car is exactly according to specifications—always. And Publicker's ultra-modern equipment and vast facilities account for outstanding service to a long list of satisfied customers. May we have the opportunity of meeting *your* requirements?

PUBLICKER INDUSTRIES

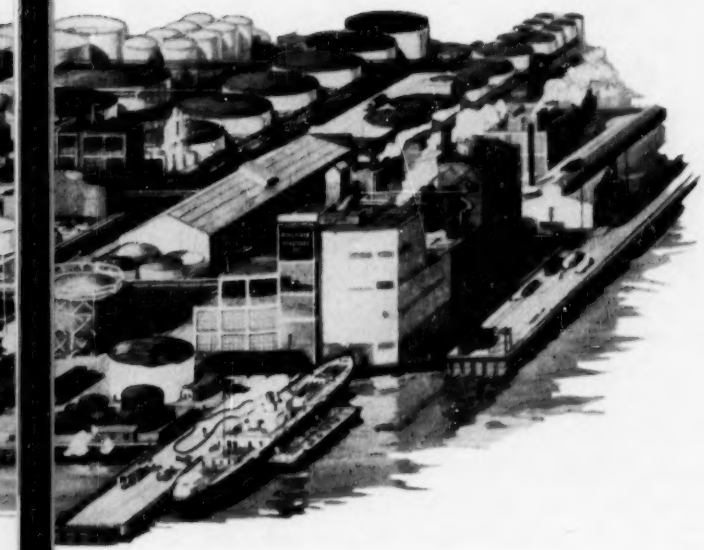
1429 WALNUT STREET, PHILADELPHIA 2, PA.

NEW YORK & NEW ENGLAND DISTRIBUTOR, PUBLICKER ALCOHOL & CHEMICAL SALES CORPORATION

PHILADELPHIA—LOCUST 4-1400 • NEW YORK—OXFORD 5-4160 • BOSTON—HOMESTEAD 9-0022 • CHICAGO—RANDOLPH 6-6678 • CLEVELAND—CHERRY 1-6140

COSMETICS

PHARMACEUTICALS



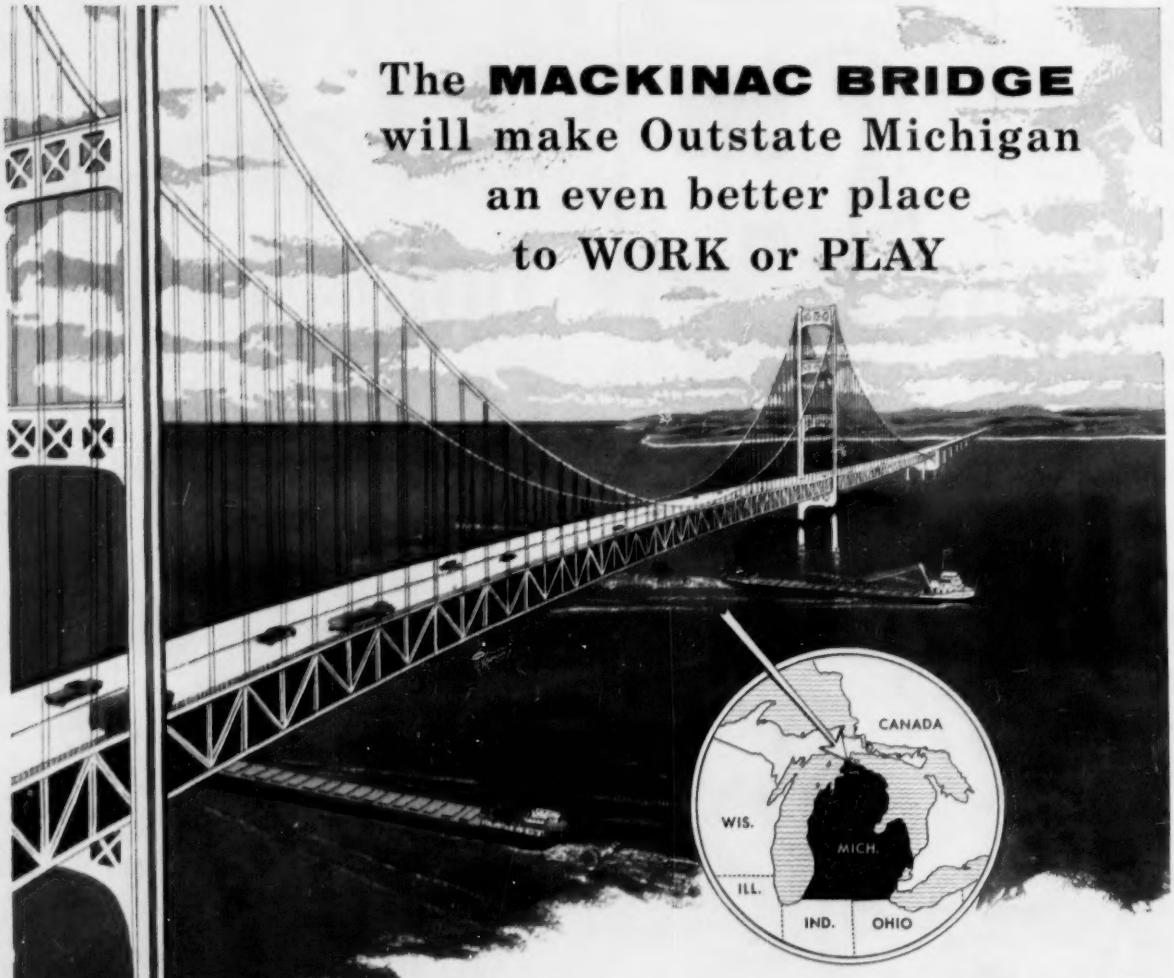
HOUSEHOLD PRODUCTS

PLASTICS

INC.

ETHYL ALCOHOL • BUTYL ALCOHOL, NORMAL
BUTYL ACETATE, NORMAL • ETHYL ACETATE
BUTADIENE • ACETIC ACID GLACIAL
ACETONE C.P. • AMYL ACETATE
FUSEL OIL, REFINED • ISOAMYL ALCOHOL
PACO SOLVENT T.R. 590

The MACKINAC BRIDGE will make Outstate Michigan an even better place to WORK or PLAY

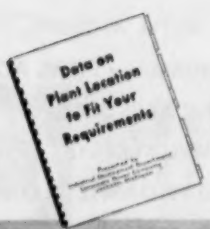


Under construction at the Straits of Mackinac is a great bridge uniting the Lower and Upper Peninsulas of Michigan.

It will be one of the world's longest bridges, with a center span of three-quarters of a mile and an over-all length of almost five miles. Completion is scheduled for the autumn of 1957.

The bridge will speed tourist and truck traffic across the Straits and make Outstate Michigan an even better place to work or play.

Outstate Michigan has many advantages as an industrial location . . . skilled manpower, central location, unequalled supply of fresh water, a favorable climate. It's the place to build your new manufacturing plant.



FOR DATA ON PLANT LOCATIONS TO FIT YOUR REQUIREMENTS
CONTACT OUR INDUSTRIAL DEVELOPMENT DEPARTMENT

CONSUMERS POWER COMPANY
JACKSON, MICHIGAN

QUALITY FERTILIZERS *and refrigerants result from dependable ammonia, the kind produced by Pennsalt.*

Wherever dependable AMMONIA is needed—

it's smart to call on PENNSALT

Order today from one of the conveniently located offices listed below—

Appleton, Wis.—Appleton 3-9307
Chicago 1, Ill.—Andover 3-6170
Cincinnati 2, Ohio—Main 3168
Cleveland 2, Ohio—Main 1-6205
Decatur, Ga.—Evergreen 5064
Detroit 26, Mich.—Woodward 1-8051
Paterson 1, N. J.—Lambert 5-3500
Philadelphia, Pa.—Locust 4-4700
Pittsburgh 19, Pa.—Atlantic 1-5233
St. Louis 1, Mo.—Central 1-2338

AMMONIA—
Refrigeration, commercial, and aqueous

CAUSTIC SODA—
Rayon and standard grades

CHLORINE—
Dependable high purity

HYDROFLUORIC ACID—
Anhydrous and aqueous

AND MANY OTHER BASIC CHEMICALS
Shipped in all standard containers, tank cars, and barges

Pennsalt Chemicals

PENNSYLVANIA SALT MANUFACTURING COMPANY • Philadelphia 2, Pa.

OPINION . . . . .

For Men in a Hurry

You're busy. You have to keep on top of the vital news that affects your business, but you simply don't have hours to spend reading. We know it; and that's why you'll notice three changes this week to help you get more out of CHEMICAL WEEK—easier and faster:

- **A new text type** (Times Roman), rated tops in readability by typographical experts.
- **A redesigned contents page** (p. 3) highlighting the week's most significant news developments.
- **A terse roundup of Washington news** (p. 20), emphasizing angles and aspects that are especially pertinent to the chemical process industries.

These improvements are just a few results of our continuous studies to make *CW* more helpful to you. And, of course, there will be more in the weeks to come.

W. Alec Jordan—*Editor*

Mint Oils

TO THE EDITOR: There is a confusing notation in your news article on mint oil production (*Aug. 20, p. 22*) . . . in which you say that mint oil from the state of Washington has a slightly lower menthol and esters content than oil grown in the central U. S. . . . I do not know whether you mean peppermint of spearmint . . .

Please refer to the *U. S. Pharmacopoeia.* Peppermint is the one that contains menthol and its esters. Spearmint contains no menthol, but carvone and other constituents . . .

HELMUT C. NEUMANN
Sterling-Winthrop Research Institute
Rensselaer, N. Y.

Reader Neumann is chemically correct. Spearmint oil gets its flavor not from menthol and esters but from carvones (ketones of menthol). The implication of what we said is, however, true: Washington spearmint is generally considered "sharper" in flavor than the central U. S. oil.—ED.

Proper Credit

TO THE EDITOR: . . . In your Target (*Aug. 6*) we were surprised to see a photo of a 110-lb. breech block cast in titanium in our laboratory . . . we were surprised and not at all pleased that no mention was made of the source of the casting . . . The government scientist often feels that although his designs and ideas are extensively used by industry, he must wait to receive his reward in the next world . . .

Perhaps if you could drop an occasional morsel of credit in our direction it would keep our morale off rock bottom . . .

A. H. ROBERSON
Chief, Process Metallurgy
Bureau of Mines
Albany, Ore.

Sorry for our picture credit oversight.—ED.

DATES AHEAD . . .

Atomic Industry Trade Fair, Sheraton Park Hotel, Washington, D.C., Sept. 26-30.

American Institute of Chemical Engineers, Lake Placid, N.Y., Sept. 26-28.

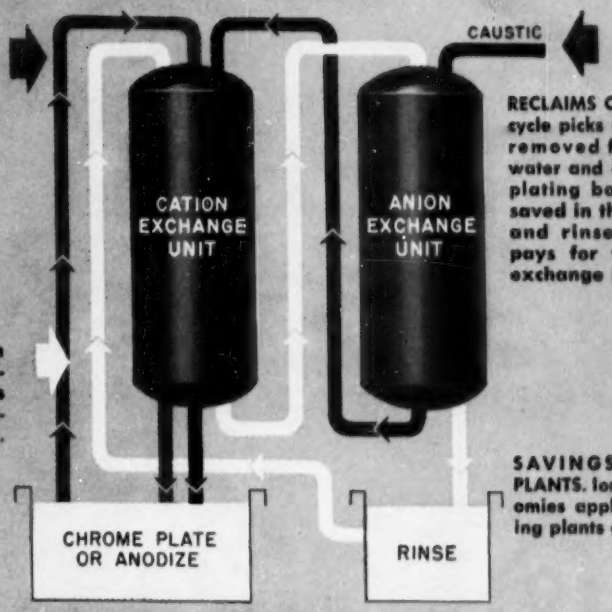
Federation of Paint and Varnish Production Clubs, and **Paint Industries' Show,** Statler Hotel, New York, Oct. 3-5.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N. Y.

PROCESSES: Ion exchange "swaps" chemicals in solution at high speed . . . purifies, recovers, concentrates, separates. An example:

How Ion Exchange Cuts Plating Costs

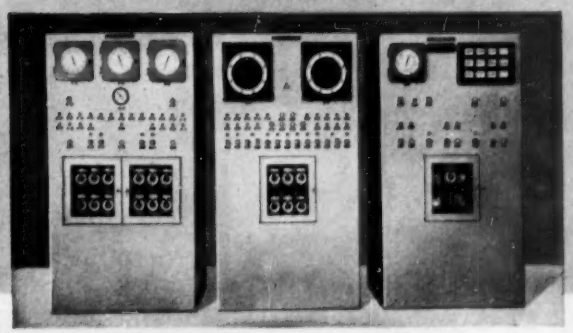


RENEWS PLATING BATH. This cycle removes aluminum, copper, iron and other impurities . . . allows continued re-use of bath . . . eliminates disposal problem. Compared with the usual toxic-waste disposal equipment, ion exchange saves up to 50% on initial costs, 75% on operating costs, 80% on floor space.

RECLAIMS CHROMATE. This cycle picks up chromic acid removed from the rinse water and returns it to the plating bath. Chromate saved in the plating bath and rinse water often pays for the entire ion exchange installation!

RENEWS RINSE WATER. Cation unit removes metallic impurities . . . anion unit removes chromic acid . . . allowing continued reuse of rinse water. Cuts consumption 90%!

SAVINGS FOR SMALL PLANTS. Ion exchange economies apply to small plating plants as well as large.



AUTOMATIC CONTROLS for ion exchangers in an auto parts plating plant. These controls simplify operation. No specially trained operators or technicians required.

*The Permutit Company

Ion Exchange Cuts Process Costs

A fast-growing unit process, ion exchange is already a multi-million-a-year business. Here are some of the jobs it's doing now:

• **Water Conditioning** is biggest ion exchange use . . . removing scale-forming hardness for homes, steam boilers . . . softening cooling water so it can be used over and over . . . purifying process water for TV tubes, synthetic fibers . . . reclaiming waste water (e. g. chromate plating rinses).

• **Process applications:** Removing impurities from formaldehyde, glycerin, alcohol, plating baths and other chemicals, also wines, sugar solutions; recovering copper and zinc from rayon plant wastes; concentrating metals in dilute solutions such as plating rinses, mine waters; removing iron from phosphoric acid pickling solutions; producing colloidal silica used in textiles, waxes, foundry molds; making antibiotics, e.g. streptomycin, and other medicinals.

• **Largest manufacturer of ion exchange equipment,** The Permutit Company (N. Y.), got a head start in ion exchange with the natural zeolites first used in water conditioning . . . now manufactures highly efficient synthetic resin ion exchangers of all types. Permutit is the only U. S. producer of both resins and equipment. Making both allows proper "mating" of the two . . . enables Permutit to take responsibility for performance of the entire installation.

If you have a problem involving the recovery, concentration or separation of chemicals in solution, a Permutit ion exchange process can probably help you. Address: The Permutit Company, Dept. CW-92, 330 West 42nd St., New York 36, N. Y.

PERMUTIT®

rhymes with "compute it"

ION EXCHANGE

for Water Conditioning • Chemical Processing

SEVERAL MINUTES' OUTPUT of 10 different phosphates dwarfs Carondelet's manager. Color-coded bags help Monsanto get "mixed car" shipments out fast, accurately, and on time.

WHERE YOU CAN GET MIXED CARS OF ALMOST ANY TYPE PHOSPHATES

Monsanto Offers World's Broadest Phosphates Line

So close to the Mississippi that some raw materials arrive by river barge, Monsanto's Carondelet, Missouri, plant makes phosphates for many nationally famous brand names. Leading its output are STP and TSPP for detergents, dicalcium and tricalcium phosphates for dentifrices, other calcium phosphates, leavening agents, and pharmaceuticals. Nowhere except at Monsanto's Trenton, Mich., plant can you select from such a wide range of phosphate compounds. What's more, you can enjoy the economy and convenience of fast "mixed car" shipment by rail or truck—enabling you to control inventories and operate with greater flexibility. Check now with the local Monsanto representative, or write: MONSANTO CHEMICAL COMPANY, Inorganic Chemicals Division, 710 North Twelfth Boulevard, St. Louis 1, Missouri.

PURE GUM RUBBER BALLS jostle phosphate through this 200-mesh silk screen. With this and other type sifters Monsanto sizes its products to meet your most exacting requirements.

THREE-SHIFT OPERATION

Smooth, 24-hour flow of product through modern equipment keeps costs in close control—to give you dependable supplies, steady prices. Monsanto STP finds its way into the majority of the country's best-known brand-name detergents—because its QUALITY is tops . . . kept that way with the strictest analytical control of every process step.

HOURLY HEAT READING of calciner sample. Monsanto regularly checks each process step not once but many times to insure uniformity, high quality. STP, alone, gets 11 different lab tests, which helps you maintain end product standards.

STAINLESS STEEL TANK TRUCK supplies phosphoric acid. Deliveries of acid, soda ash, lime, other raw materials are scheduled to insure unfailing phosphate stocks for Monsanto customers.

HOUSEHOLD WORDS . . . baking powder, toothpaste, tooth powder, detergent. In most, the effective ingredient is a phosphate "builder"—very often a Monsanto product made at Carondelet.

JUST PUBLISHED!

An easy-reading booklet giving a brief yet complete review of technical and commercial aspects of sodium phosphates. For your copy ask a Monsanto representative, or write: MONSANTO CHEMICAL COMPANY, Inorganic Chemicals Division, 710 N. Twelfth Blvd., St. Louis 1, Mo.

MONSANTO
CHEMICALS—PLASTICS

SERVING INDUSTRY...WHICH SERVES MANKIND

...GEST PRODUCER OF ELEMENTAL PHOSPHORUS

INFRA RED SPECTROPHOTOMETERY *is only one of many modern instrumental control tests utilized by Cosden to insure unexcelled quality and uniformity.*

benzene

ACS Reagent Grade Specifications
ASTM D835-50, Nitration Grade (1°)
ASTM D836-50, Industrial Grade (2°)
Federal Specification VV-B-231a

toluene

ACS Reagent Grade Specifications
ASTM D841-50, Nitration Grade (1°)
ASTM D842-50, Industrial Grade (2°)
ASTM D362-36, Industrial Grade (PV&L)
JAN-T-171 Specifications
Federal Specification TT-T-548a

xylene

ASTM D846-50, Ten Degree
ASTM D364-36, Industrial Grade (PV&L)
Federal Specification TT-X-916, Grade A

Produced at Big Spring, Texas, by one of the world's largest independent inland refineries, Cosden aromatics possess properties far exceeding those stipulated under the most exacting industrial specifications. Of superior stability and solvency, they contain no detectable non-aromatic impurities or sulfur compounds.

chemical division

Organic Chemicals Division ■ *Cosden Petroleum Corporation, Big Spring, Texas*

● distributors in principal Midwest cities

NEWSLETTER

Riding the crest of a wave of optimism, chemical stocks were unusually active last week.

Dow Chemical common sold at a 1955 record high—apparently whipped up (in part at least) by word that ethylene glycol and ethylene oxide capacity at Freeport, Tex., will be increased by 60 million lb./year (*See p. 20*).

Allied common was notably active, reflecting Wall Street enthusiasm for polyurethane's potential; American Cyanamid was moving up—spurred, financial circles felt, to some degree by investors intent on short-term profit-making.

Foreign buying of Royal Dutch was again reported; and Phillips Petroleum common, on the strength of company predictions that net profit and gross income this year will register an all-time record, was in heavy demand.

•

Current report which the company will neither confirm nor deny: that Standard Oil of New Jersey will split its common stock sometime within the next 30 days.

•

Large purchases of Monsanto common by company officials reflect the first significant exercise of stock options made possible by a plan adopted in 1951.

Robert Cole, executive vice-president, has picked up a block of 36,000 shares (with a current market value of $1.7 million), and Vice-President Francis Curtis has purchased 4,000 shares (with a current value of nearly $200,000). Previously Cole held 300 shares (directly), Curtis had 1,950 shares. Both options were exercised at the New York Stock Exchange closing price on the day they were granted (probably between $28.80 and $35.30—adjusted for the three-for-one stock split last June); current price: $48.

•

Reports were circulating throughout Mexico City last week that three Brady-controlled sulfur companies—Pan American Sulphur Co., Mexican Gulf Sulphur and Gulf Sulphur Corp.—are on the point of merger. Company officials refuse to comment, but observers note that merger talk has its roots in some economic logic (*CW, Aug. 27, p. 17*).

Two giant sulfur companies (Texas Gulf Sulphur Co. and Freeport Sulphur Co.) have been said to be considering whether to go into Mexican production; the three smaller firms, with their initial start, could offer much stronger competition if they were banded together.

•

Also south of the border: Mexico looks like a shoo-in to win another round in its battle to produce needed materials domestically, and thereby reduce dollar-consuming imports.

Construction of a $13-million newsprint plant starts this month, which, when completed (by mid-1958), should cut import costs some $8.8 million/year. The mill (with a capacity of 30,000 metric tons annually) will be Mexico's first domestic source of newsprint.

NEWSLETTER

Removal of additional import quotas on chemicals appears imminent this week in France. Quantitative restrictions (for imports from member nations of the Office of European Economic Cooperation) have recently been raised on aluminum oxide, various nonferrous carbides, nitrogenous fertilizers, propyl and isopropyl alcohol; importers expect the list to be extended early in October.

France, which has lagged behind other European nations in freeing its nondollar trade from quotas, thereby becomes a prime trade target of OEEC member countries with heavy chemical surpluses; U. S. exporters can well expect to have their markets severely challenged.

•

It now looks like a petrochemical plant for Peru. Signing an agreement with Fertilizantes Sinteticos S. A. to supply technical aid last week was Montecatini; Banco Comerciale de Milan will supply the necessary financing. Cost will be $7 million; initial products will include nitrogenous fertilizers and nitric acid.

•

"Rigged" or "normal"—that's what the U. S. District Court in Salt Lake City will be trying to decide this week about the prices charged by the four Utah salt producers whose nonjury antitrust trial ended late last week.

The government introduced 1,100 documents in support of its charge that the firms entered into an agreement to keep salt prices up. The defendant companies put on the stand an economist who testified that normal economic processes in the market cause prices to stabilize at a relatively high level.

•

Warnings are out to all industrial customers of Bonneville Power Administration energy to expect curtailments in interruptible energy sometime late this month.

Columbia Basin river flows have plummeted to near-critical levels, and weather forecasters hold out little hope that the situation will ease in the immediate future.

Eight companies involved are in a position to protect their production by borrowing hydro storage from Hungry Horse reservoir; the balance will probably be able to make up part of the interruptible deficiency from nonfederal hydro and steam resources in the Northwest.

But the situation is bound to have a disquieting effect on companies with expansion plans for the area. Good guess: several such firms will hold up, awaiting outcome of drought conditions.

•

Another large pulp mill is on the slate for Alaska—courtesy of a combine of Japanese interests.

Wood supply for the $50-million magnesia-base mill will come from sustained-yield harvesting of 7.5 billion board ft. of U. S. government-owned western hemlock—due to be put up for sale next month.

The Japanese intend to export pulp to their home islands for processing into products for sale in Oriental markets.

•

Industrial grapevine teaser of the week—that Westvaco Div., Food Machinery & Chemical Co., was on the verge of moving out of pilot plant into basic isocyanate production—is denied this week.

Company executives say there is no truth to it—that Westvaco will merely continue to operate its pilot plant "in line with a predetermined course of development."

How one firm proved that Fulton's New Sleeve could lick their Sifting Problem . . .

At a Saving of $2.25 a Thousand Bags!

BY J. FRANK GREELEY
Director of Multiwall Paper Bag Sales
Fulton Bag & Cotton Mills

They Had to be Shown. Sifting could make a big profit-and-loss difference in this company's operation. Fulton's new Ful-Flex Non-Sifting Sleeve looked different and promised new economies. They tried it out.

Comparison Showed that Fulton's Ful-Flex Sleeve was of extra size, and made of special flexible paper. They tested it thoroughly. First...

Actual case history in our files—name on request.

They Tested for Sifting on the conveyor belt. Careful scrutiny of the floor area underneath showed no significant sifting had developed. What would happen during shipping? They checked . . .

A Double Check at point of arrival was made. Floor of freight car showed barely perceptible sifting had taken place. Weigh test proved sifting loss had been negligible . . . at a saving of $2.25 a thousand!

Fulton
BAG & COTTON MILLS

ATLANTA • CHICAGO • DALLAS • DENVER • KANSAS CITY
LOS ANGELES • MINNEAPOLIS • NEW ORLEANS • NEW YORK
OKLAHOMA CITY • PHOENIX • ST. LOUIS • SAN FRANCISCO
SAVANNAH • WINTER HAVEN

Let's investigate whether Ful-Flex sleeve can solve a problem for you.

GENERAL SALES OFFICE
FULTON BAG & COTTON MILLS
P. O. Box 198, New Orleans 3, La.

We have a sifting problem in packing _____
(Please feel free to write Fulton full details in complete confidence)

Name _____

Company _____

Address _____

Please write ☐ Have representative call ☐

the new PERMA KLEERS

3 *three powerful organic sequestering agents for complete control of*

IRON

CALCIUM

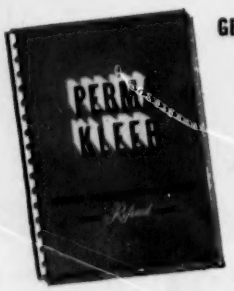
MAGNESIUM

and other troublesome metals!

80 the all-purpose sequestering agent

SP specific for iron

OH specific for iron in caustic



GET THE FULL STORY ON PERMA KLEERS
— and their superiority over EDTA in terms of effectiveness, and cost. Find out how PERMA KLEER-80, for example, widens the scope of organic sequestrants, due to its compatability with soaps, detergents, chemicals and solvents—its efficiency under hot or cold, acid or alkali conditions—its ability to provide greater metal chelation per pound of sequestrant.

We also manufacture a complete line of EDTA— in the name of PERMA KLEER-50 LIQUID • PERMA KLEER-50 BEADS PERMA KLEER-50 TRISODIUM SALT • PERMA KLEER-50 DISODIUM SALT PERMA KLEER-50 ACID ...*we suggest you send for our latest revised booklet explaining testing methods and comparisons.*

Refined PRODUCTS CORPORATION
Manufacturing Chemists
628 SCHUYLER AVENUE • LYNDHURST • NEW JERSEY

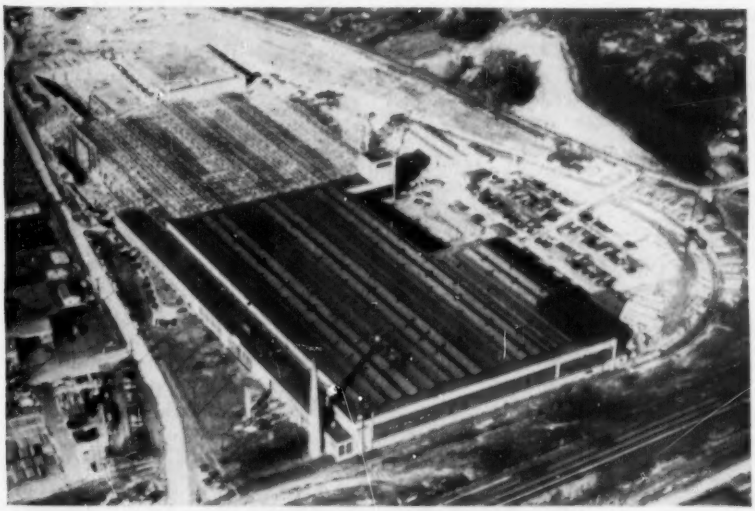
TEXTILE DIVISION REPRESENTATIVES

Southern: CARBIC - MOSS CORP., 2511 Lucena Street, Charlotte 6, N. C.
New England: AMERICAN CHEMICAL & SOLVENT CO., 15 Westminster St., Providence 3, R. I.
California: SIDNEY SPRINGER, 311 S. San Pedro St., Los Angeles 13, California
New York: CARBIC - MOSS CORP., 451-453 Washington St., N. Y. 13, N. Y.
Canadian: RELIABLE CHEMICAL PRODUCTS CO., 85 Cannon St., W., Hamilton, Ontario
Central Eastern: ADVANCED PRODUCTS CORPORATION, New Hope, Pennsylvania
European: CHEMITALIA COLORI, Corso Venezia, N. 56, Milano, Italy

INDUSTRIAL DIVISION REPRESENTATIVES

New England: AMERICAN CHEMICAL & SOLVENT CO., 15 Westminster St., Providence 3, R. I.
Midwestern: UEBEL CHEMICAL CO., 410 N. Michigan Ave., Chicago 11, Illinois
Midwestern (Detroit Area): R. A. WILLINNGANZ, 205 East Ann St., Ann Arbor, Michigan
Southwestern: RELIANCE CHEMICALS CORP., 2437½ University Blvd., Houston 5, Texas
So. California: CHEMICAL-ADDITIVES CO., 3155 Leonis Boulevard, Vernon 58, California
No. California: WILLIAM C. LOUGHLIN & CO., 311 California St., San Francisco 4, Calif.

BUSINESS & INDUSTRY . . . .



IN PRIVATE HANDS NOW: At Hailethorpe, Md., ex-U.S. extrusion plant.

Speeding Up the Spadework

Like honeybees hustling to garner more nectar before the first frost, this country's primary aluminum producers—actual and aspirant—are buzzing about this week to speed up the engineering, financing and government red-tape spadework for their more - than - $800 - million expansion program.

Understandably, they're in a hurry to get this new capacity into production while demand for the light, bright metal is keen. Immediate prospects: supply to remain tight. The federal government will collect only one-fourth of its stockpile quota for the next three months, allowing private customers to buy the other 75,000 tons; but an industry advisory committee was recommending that the U.S. refrain from buying any more aluminum at all this year.

And late last week at Chicago, members of the American Die Casting Institute were warned by an Aluminum Co. of America vice-president that 1956 might not bring much relief, inasmuch as only a small percentage of presently planned expansion "will actually come into being next year."

Delayed Action: At Washington last week, the General Services Administration signed a contract that will enable Harvey Machine Co. to start construction promptly of the $65-million, 54,000-ton/year reduction plant on which Harvey has been trying to get clearance since 1953.

Signing of that contract didn't signal a break on the government's long-awaited decision whether to encourage a new round of aluminum expansion. It just happened that action on the Harvey proposal was held up until the parties agreed that the company —not the government—would pay for construction of a $2-million transmission line to bring in hydro power.

Still waiting for governmental action—and getting more fidgety every minute,—is Alcoa, which wants to get started no later than next year on a new alumina plant to keep up with its expanding smelting capacity. Alcoa hopes to build this 200-300-million-ton/year plant on Matagorda Bay, Tex.; but this depends on the Corps of Engineers' getting an appropriation to dredge a 30-ft. channel there.

Kaiser is arranging a sale of 700,000 shares of par $50 preferred stock to acquire new capital for it expansion program, which includes a $6.2-million addition to the extrusion plant it recently bought from the U.S. for $3.8 million (*see cut*). Olin Mathieson is searching out a site for its $79-million, 60,000-ton/year reduction plant; and St. Joseph Lead and Revere Copper & Brass are awaiting Office of Defense Mobilization action on their requests for fast write-offs and other aid.

Still on the Upswing

West Germany's chemical industry is united on at least one score this week—the belief that export sales will continue to pick up over the last half of 1955. Reason: despite growing competition of U.S. and Japanese exports, Germany has made considerable inroads on new markets in the past few months; prospects of picking up additional markets in the months ahead look good.

This year, West German chemical exports have already exceeded (by 18%) last year's totals; for the first six months of 1955, value stood at over 1,630 million marks.

Setting the pace: exports of basic industrial chemicals, which over the first half rang up 414 million marks, and overseas sales of nitrogenous fertilizers, which advanced to a total sales value of 145 million marks.

Single Soft Spot: Only group of chemical exports to suffer a decline in 1955 so far are coal-tar dyes (due to lower sales in Pakistan and Argentina).

But German industrialists openly expect this picture to change rapidly —particularly in view of markets opening up elsewhere in Asia and on the Continent. Particularly pleasing are reports from trade representatives who recently toured throughout the Middle East: reception of German-produced products, they report, is better than at any time since World War II.

Washington Angles »

» **You may soon be able** to get financial data from more chemical companies. The Securities & Exchange Commission is currently studying the subject, will advise Congress how much information it thinks firms whose stock is traded over the counter should file.

Included would be such companies as: American Phenolic, Foote Mineral, Gulf Sulphur, Harshaw, Eli Lilly, Mallinckrodt, Mexican Gulf Sulphur, Michigan Chemical, Pan American Sulphur, U.S. Potash, and Vitro Corp.

» **Tax write-off turnbacks** by chemical companies are mounting. Latest returnees include Du Pont (which has asked cancellation of a $40-million titanium certificate), Allied (which has turned back grants on two sulfuric acid plants at Newark, N.J., and Uniontown, Pa., totaling $11.4 million), and American Cyanamid (which has requested cancellation of a $2.3-million write-off for a Bridgeville, Pa., polyester resin plant).

Allied's cancellations mirror a decision to abandon construction of the two sulfuric acid units —planned when sulfuric was short during the Korean War; Du Pont's cancellation was made after company officials (in response to a GSA request) called off building new titanium sponge units; Cyanamid's recall came as the result of a policy decision to transfer equipment from other facilities to gain desired additional capacity at Bridgeville.

» **The fate of Aramite** will soon be decided by the Food & Drug Administration. Upon the request of U.S. Rubber, an advisory committee review of FDA's decision (that no residue of the miticide be allowed on fruits and vegetables) has been made, but Food & Drug has yet to reveal the group's findings.

» **Speedier drug marketing may be ahead.** Indicating the change of official Washington opinion on the subject: pharmaceutical makers, who have long felt stymied by refusal of FDA's new drug branch to process "incomplete" applications, can now appeal to top FDA brass for aid—even if the new drug branch protests.

» **There's a $13.5-million expansion investment** in store for the Atomic Energy Commission's Rocky Flats, Colo., chemical processing units.

Catalytic Construction Corp. will be in charge of expansion at the Dow-run plant.

» **Faster radioisotope delivery** from the Bureau of Standards is ahead. The bureau plans operation of a new lab—chiefly for the purpose of expediting distribution of 57 isotopes used in calibration and similar measuring devices.

» **Chemical futures include:** a Tariff Commission final report on '54 organic chemical production and sales, ready about Oct. 15; Chemical Corps bid openings on 2.8 million lbs. of hydrated calcium chloride, Oct. 8; Texas City disaster claim-filing rules (by the Dept. of the Army), Oct. 11.

COMPANIES . . .

Southern Nitrogen Co., Inc., the firm that plans to put up new petrochemical facilities in Savannah, Ga. (*Newsletter, Sept. 17*), has completed arrangements for $18 million in financing.

Part of the money, says John Riley, president of the recently organized firm, will be obtained from a long-term loan (placed with a life insurance company), part through direct placement of other securities.

•

American-Marietta Co. has purchased Stoner-Mudge, Inc. (Pittsburgh) —one of the country's largest producers of coatings for lining cans.

The acquisition involved an exchange of shares worth $7 million.

•

Commercial production of oil from bituminous sands of northeastern Alberta appears more imminent this week with disclosure that the Alberta government's experimental extraction pilot plant has been sold.

Purchaser is Can-Amera Oil Sands Development Ltd. (Calgary).

Price of the plant (along with oil rights on 5,874 acres of land) was $180,000, but it's estimated that Can-Amera will have to spend between $35-50 million to get into full-scale production.

•

Stanolind Oil & Gas Co. has completed negotiations with two Cuban oil firms for exploration and drilling rights to 12 million acres of land in Cuba.

Under terms of the contract, Stanolind must spend at least $2 million in exploration and drilling operations by Jan. 1, 1957, and can choose to extend its option (expending a similar amount) every 12 months.

After 5 years, Stanolind gains a half interest on the entire 12 million acres—if the deal continues in effect that long.

EXPANSION . . . .

Cement: Permanente Cement Co. will expand its operations into southern California with construction of a $12-million plant in San Bernardino County. The plant (with an initial capacity of 2 million bbls. of portland cement annually) is scheduled to start production in the early fall, 1956.

•

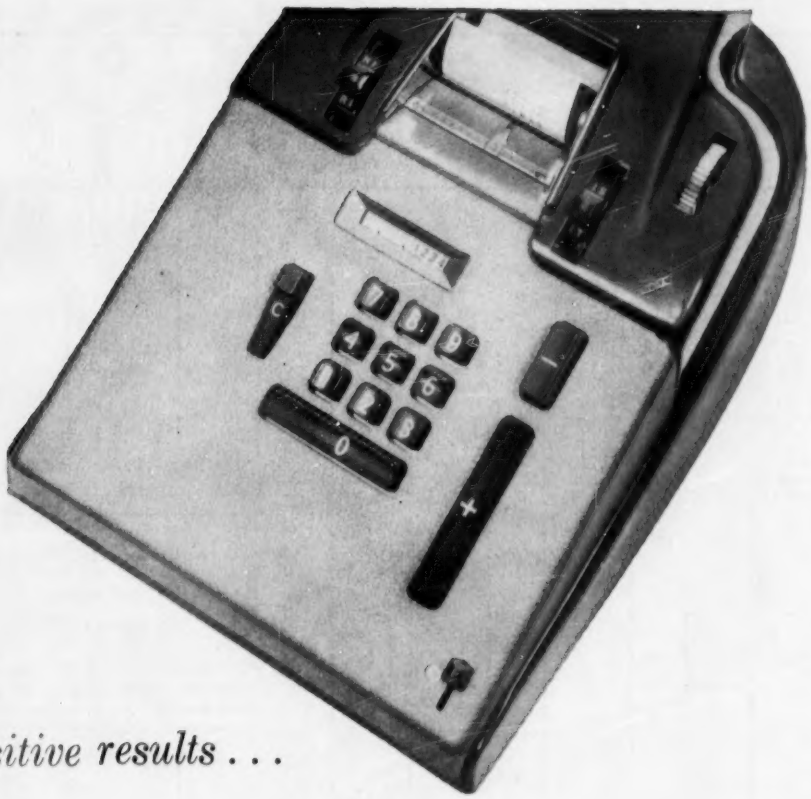
Ethylene: Gulf Oil Corp. is reported to be studying plans to further expand its Port Arthur, Tex., plant.

Currently (with a new production unit just onstream), Gulf's ethylene capacity at Port Arthur is 365 million lbs./year. The additional unit, if built, would add 200 million lbs./year.

•

Ethylene Glycol: Construction work on units due to boost Dow's ethylene glycol and ethylene oxide producing capacity at Freeport, Tex., is nearing completion this week.

The additional capacity will total 60 million lbs./year.



You get
positive results . . .

when you use FLEXOL PLASTICIZER TOF

Trade-Mark

- *Unexcelled low-temperature flexibility*
- *Flame resistance*
- *Resistance to water extraction*
- *Resistance to plasticizer "rub-off"*
- *Fungus resistance*
- *Plastisols with minimum dilatancy and excellent viscosity stability*

These are the properties of vinyls plasticized with FLEXOL Plasticizer TOF (tri(2-ethylhexyl) phosphate)—it's a unique combination. No other plasticizer offers all these plus values.

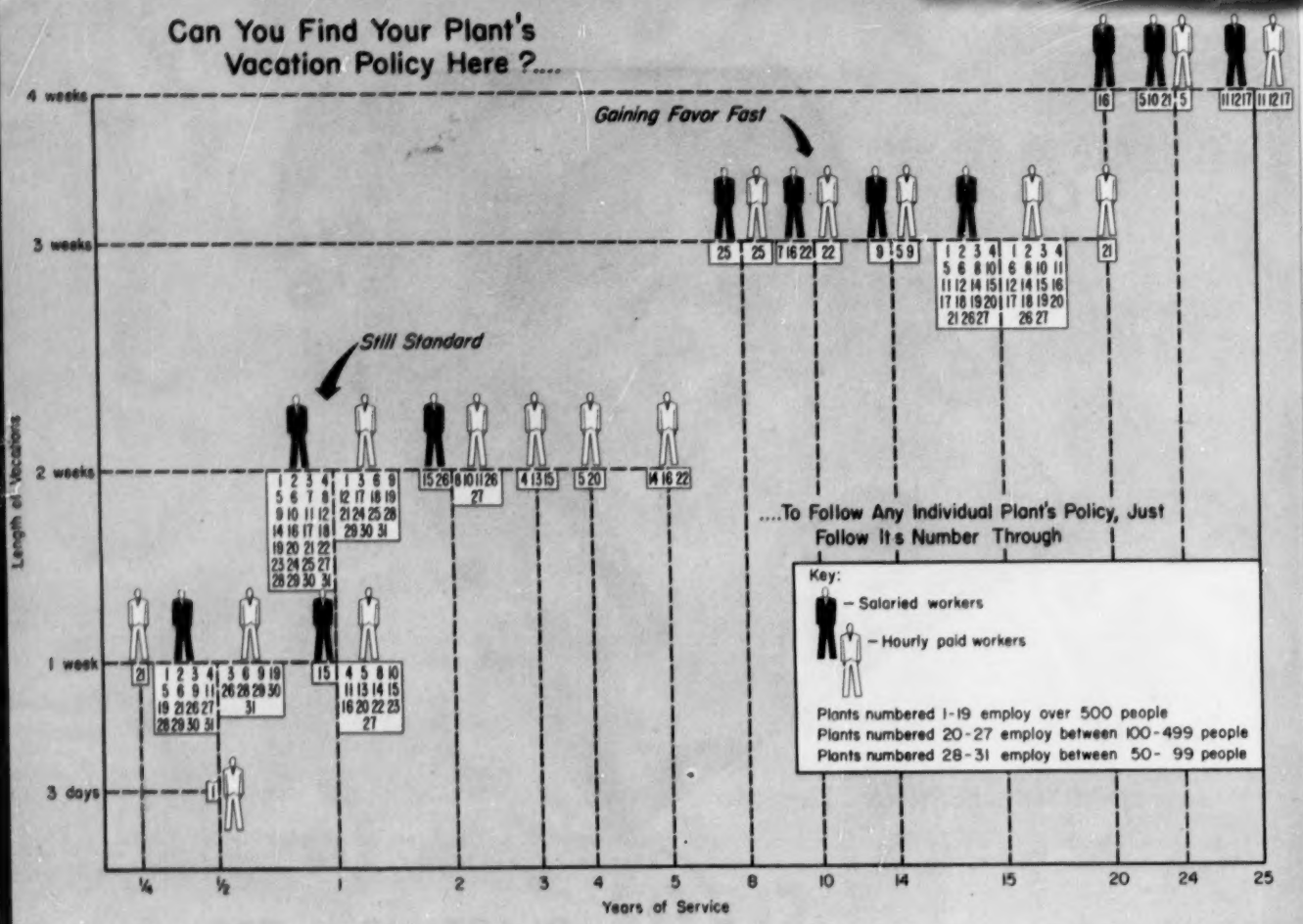
FLEXOL TOF performs with distinction in vinyl upholstery, coated fabrics, rainwear, outerwear, cable jackets, strippable coatings, window channeling, foamed vinyls, plastisols, and rubber compounds. Take a look at TOF for all your low-temperature applications, either as the sole plasticizer or in blends.

For complete information on FLEXOL TOF, the low-temperature plasticizer with added value, call or write the CARBIDE office near you. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.

The term "Flexol" is a registered trade-mark of Union Carbide and Carbon Corporation.

CARBIDE AND CARBON CHEMICALS

Carbide and Carbon Chemicals Company
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street New York 17, N. Y.



Topical Topic: of Growing Importance

With summer vacations rapidly racing toward total eclipse, chemical industrial relations men may well take time to check up on their industry's rapidly changing vacation policies.

Seeking to ferret out what's new on this always-important employee relations subject, a *CW* survey this week points up a significant fact:

In an era of tightening manpower requirements, the vacation—as a come-on lure—is achieving a prominence never imagined a decade ago.

Spot-checking vacation policies that now exist in 31 typical plants across the nation*, the survey further shows that:

- A two-week vacation for one year of service is still favored by most companies.
- A one-week vacation after six months' employment is still usual.
- Some few companies, however, (mainly in the medium-to-large category) are less liberal—prefer to wait two, three, four, and even five years before allowing hourly paid employees two-week vacations. Salaried workers in these plants generally fare better.
- A three-week vacation after 15 years of service appears to be standard in the industry now. That applies to salaried and hourly paid personnel. Isolated cases, however, crop up where three-week holidays are granted both echelons as early as 8-10 years after initial date of employment. Some companies, on the other hand, delay this benefit for "blue-collar" workers until as long as 20 years after employment.
- Month-long respites are beginning to figure prominently in the vacation picture, too. White-collar veterans of 20 years or more of service now rate them in most firms. Hourly paid employees are likely to collect their month's share of off-time benefits usually after 25 years' seniority.

Far From Static: But though these generalizations on chemical company vacation policy may hold true now, the picture is far from static. As one West Coast chemical official says, "Vacations are like any fringe benefit. They're always changing."

Feeling now among larger chemical company industrial relations men is that the greatest change will come when unions start requesting three-week holidays for 10 years' service; four weeks for 15.

But that won't happen soon—at least not until the chemical industry as a whole grants three-week vacations after 15 years' service—not a general practice today.

The hike to three weeks for 10 years of service, however, looms as a definite immediate possibility. Reason: the automotive industry has already adopted the practice, and chemical unions could press for similar industry demands at any time.

In fact, one large salt producer, with close to 220 plant workers, will

* Survey cross section: 19 plants employing over 500 salaried and hourly workers; 8 employing between 100 and 499 people; and only 4 with smaller forces of between 50 and 99 employees.

Enough to make the difference...

HUDSON

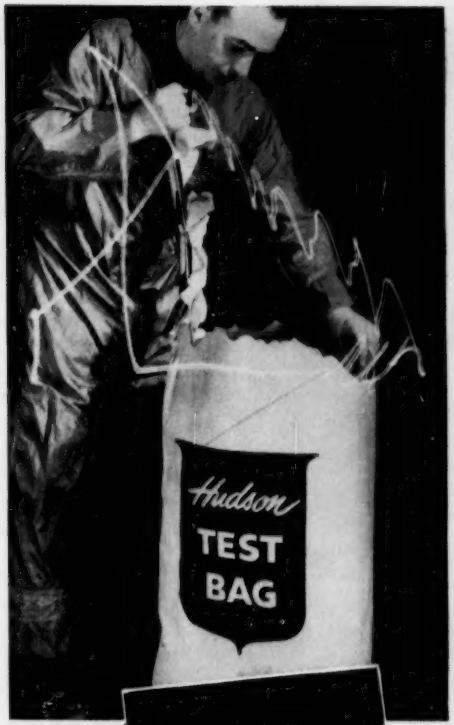


Photo left: Actual light tracing photo shows how knife blade or pull and tug method of opening wastes time and product.

Photo right: Snap motion opening – saves time and product.

Snap-Open®
MULTIWALL SACKS...

EXTRA POINTS FOR HUDSON

QUALITY CONTROL from tree planting to sacks, Hudson is fully integrated.

WRITTEN GUARANTEE your assurance of complete satisfaction in advance.

RIGID INSPECTION includes a 39-point inspection and test program.

NON-SLIP INK available at no extra cost.

MODERN PRINTING PLANT for extra display appeal, increased sales for your product.

SPECIAL SERVICES on delivery, storage and on inventory control problems.

PROBLEM PRODUCT PACKAGING specialists to study your particular requirements.

SNAP-OPEN SACK available to you at no extra cost — comes in most sizes.

Provide Speed, Ease, and Economy

The pull and tug days of opening bags are over! Now you can offer your customers the Hudson Snap-Open Multiwall bag... the one bag that opens the fastest, easiest...with just a flick of the wrist...the one bag that guarantees full measure of its contents no matter how fast it's opened.

Engineered by Hudson to meet the demands of the farmer and processor alike, the Snap-Open Sack outperforms conventional opening bags in actual tests...without a trace of spilling. Here is the answer to speed, ease, and savings...with the built-in feature of flow control.

Dealers everywhere are asking for the new Hudson Snap-Open Sacks. Be among the first packaging your product in this newest bag.

Additional shipping points: Wellsburg, West Virginia, Pine Bluff, Arkansas, and Charlotte, North Carolina.

Hudson Pulp & Paper Corp., Dept. CW9, 477 Madison Ave., New York 22, N. Y.

YES... send us information on your Snap-Open Sack and its sales building opportunities.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Now the Peels Make a Profit, too!

Sweet, wholesome canned pineapple juice and pineapple slices come from the center of the fruit. But what happens to the skin?

Hawaiian Pineapple turned the peels into dollars by extracting the juice from these otherwise wasted materials. The juice is then clarified by two Oliver Vacuum Precoat Filters. The filtrate is further processed to obtain pure natural fruit sugar, and pure crystallized citric acid, which become end products that add to the profit.

If you have a problem involving the separation of finely divided solids in suspension, the use of fluidizing techniques or ion-exchange, the chances are that Dorr-Oliver and its Associated Companies throughout the world can be of service to you.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

Length of Vacations

sport a union contract next year calling for three-week vacations after 10 years, instead of current three weeks for 15.

Aside from this possible major policy change, revisions taking place in chemical industry right now are on a plant-by-plant basis.

Larger Firms Liberal: As well might be expected, vacation policies tend to be most liberal in larger-size companies. Chief reason: as with other fringe benefits, bigger companies can better afford the luxury.

One case in point: a south San Francisco firm, which, in addition to granting standard vacation to hourly paid and salaried workers, offers a bonus. After 25 years of service, every employee can take one six-week vacation—in any year of his choice.

What's more, company personnel can pick any time of the year for this bonanza vacation, or can split the reward—taking a few days at a time.

Some smaller chemical companies, on the other hand, are unusually generous too. A Chicago firm, for example, numbering 36 employees, grants one week off no matter how recently the employee has joined the firm.

"We believe," says its president, that "no matter how recently someone is hired, he or she probably needs a rest." Carrying its reasoning through, the company allows two weeks off for six months' service, and three weeks off after five years. (That has been company policy for 44 years.)

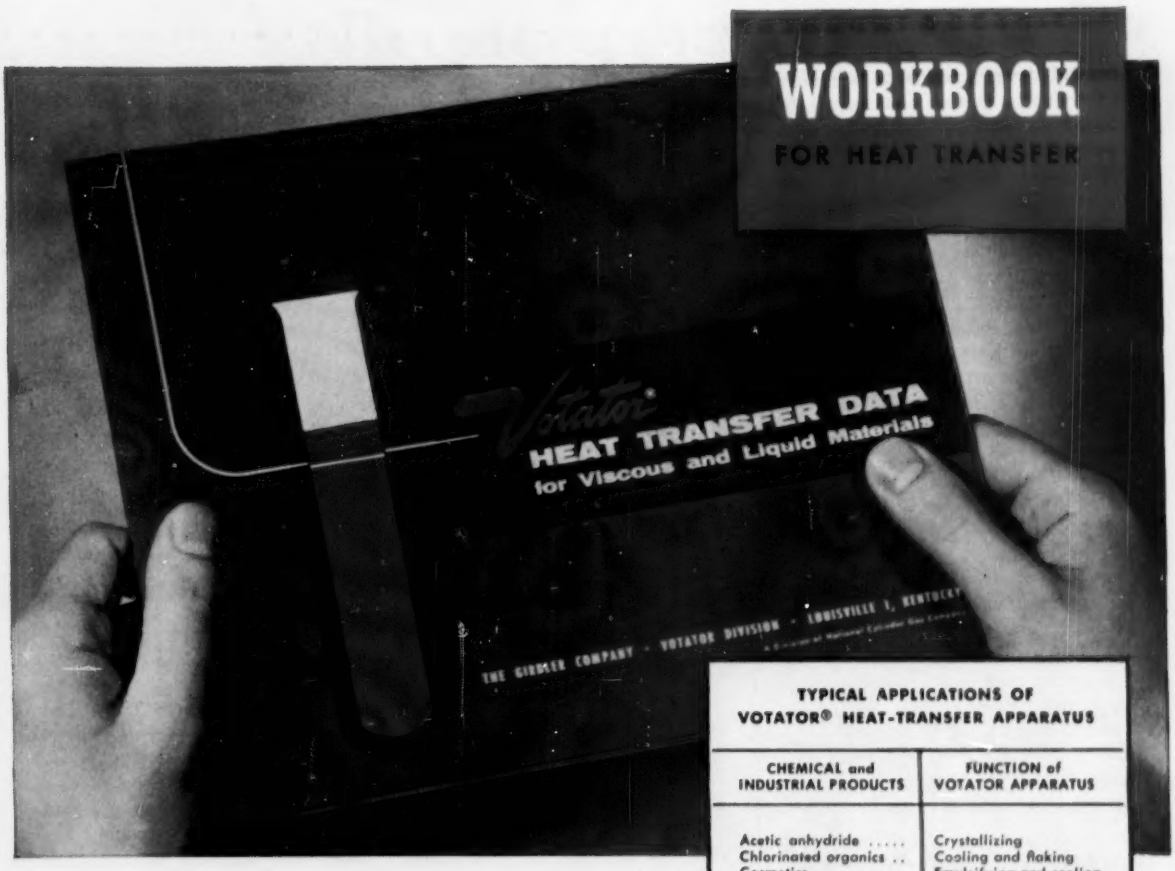
Shifting Habits: While most companies seem to agree that vacation policies have undergone no drastic changes in the past year, vacation habits have shifted markedly.

- Winter vacations are gaining favor fast.
- More and more employees are tending to split vacations—taking half in the summer, half in the winter.

Surprisingly enough, the latter trend is one that chemical personnel men and medical directors would like most to avoid. Taking a vacation all at once, they argue, is the only way it can really be beneficial to employee health.

In fact, to insure that its employees derive maximum rest benefits, many companies right now make consecutive-week vacations mandatory.

What About Shutdowns? As far as completely closing down chemical plants during vacation periods is con-



TYPICAL APPLICATIONS OF VOTATOR® HEAT-TRANSFER APPARATUS

CHEMICAL and INDUSTRIAL PRODUCTS	FUNCTION of VOTATOR APPARATUS
Acetic anhydride	Crystallizing
Chlorinated organics	Cooling and flaking
Cosmetics	Emulsifying and cooling
Drying oils	Control of reaction temperature
Gelatin and glue	Chilling and extruding
Industrial starch paste	Cooking and cooling
Lubricating grease	Heating, cooling, jelling and homogenizing
Napthalene	Cooling and crystallizing
Paper coating	Cooking and cooling
Paradichlorobenzene	Crystallizing
Petroleum polymers	Polymerizing
Pharmaceutical gels	Cooling
Photo emulsion	Cooling, jelling and extruding
Printing ink	Heating and cooling
Resins (fluid)	Polymerizing and cooling
Shaving cream	Cooling and plasticizing
Soaps	Cooling and extruding
Sodium chlorate	Crystallizing
Sulfonates and sulfates	Reacting
Textile print gums and sizes	Cooking and cooling
Viscose	Heating and cooling
Waxes	Crystallizing, extruding and packaging
Wax emulsions	Mixing and cooling
Vinyl chlorides	Cooling and foaming

Use it to improve quality control and efficiency in your processing

This new booklet prepared by Girdler's VOTATOR Division provides you with practical, working data on heat-transfer. Sections include: Application of VOTATOR* Continuous Processing Apparatus; Temperature, Heat, and Specific Heat; Basic Concepts of Heat Transfer; Properties of Heat Transfer Media; and handy conversion tables and conversion factors for processing work.

Engineers of Girdler's VOTATOR Division are the recognized leaders in developing processes and equipment for processing heat-sensitive or viscous liquids continuously under closely controlled temperature and pressure conditions. Thus you'll find this workbook accurate, authoritative, and up-to-the-minute.

For your free copy, send the coupon today. The Girdler Company, Votator Division, Louisville 1, Kentucky.

*VOTATOR — Trademark Reg. U. S. Pat. Off.

THE GIRDLER COMPANY, VOTATOR DIVISION
224 East Broadway • Louisville 1, Kentucky

Please send me free copy of "Heat Transfer Data"

Company _____

Address _____

City _____ *Zone* _____ *State* _____

My Name _____

My Position _____

the GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY
LOUISVILLE 1, KENTUCKY
VOTATOR DIVISION: New York, Atlanta, Chicago, San Francisco
GAS PROCESSES DIVISION: New York, San Francisco
In Canada: Girdler Corporation of Canada Limited, Toronto

cerned, the idea seems to be fading out of the picture. Reason: continuous reactions are making shutdowns more and more impossible.

Discussing the possibility of granting vacations in this manner, one company spokesman says, "All our plants are geared for year-round production. Shutdowns are now far too expensive even to consider." That reflects an attitude popular throughout the industry.

One Other Trend: There's one last noteworthy point in the chemical vacation policy picture: more and more companies today are willing to concede extra time off if vacations happen to encompass holidays.

Obvious advantage of this practice to the company: employees don't shun holiday weeks for taking vacations. That means spreading vacations out more evenly over the year, discouraging clustering in nonholiday periods.

That vacation policy administration is a prime management-employee issue is now clearly evident. And management men, now devoting a great deal of attention to the problem, are likely to be spending a great deal more time on it in the future.

Interrelation Admitted

Once again, last week, the government tacitly admitted—relative to the tariff situation—the growing importance of industry in the national defense picture.

In appointing Harold D. Gresham (formerly of the Tariff Commission and the Central Intelligence Agency) to the post of special advisor to the Office of Defense Mobilization, it recognizes the need to consider claims (made by U.S. industries) for special tariff or quota protection because of their connection with defense.

Actually, the appointment stems from a clause in the new Trade Agreements Act—requiring ODM to weigh industries' demands for special protection, and to recommend action by the President.

Segments of the chemical industry —notably in the synthetic organic field—have been stumping for this sort of special consideration for years.

Gresham's recommendation, to be sure, won't be binding on the President. But it will, to some degree, influence his thinking. And to that extent, defense-related companies have scored a victory in his appointment.

Mrima Hill: Mound of Wealth?

Forest-smothered Mrima Hill (a volcano that hiccoughed but never blew), could prove to be the mound that will revolutionize Kenya's economic future.

Located on the shores of the Indian Ocean, some 50 miles south of Mombasa, early boreholes (some 90 ft. below the surface) have turned up deposits—6% niobium, and 13½% rare earths—including radio-active monazite (which in turn contains thorium).

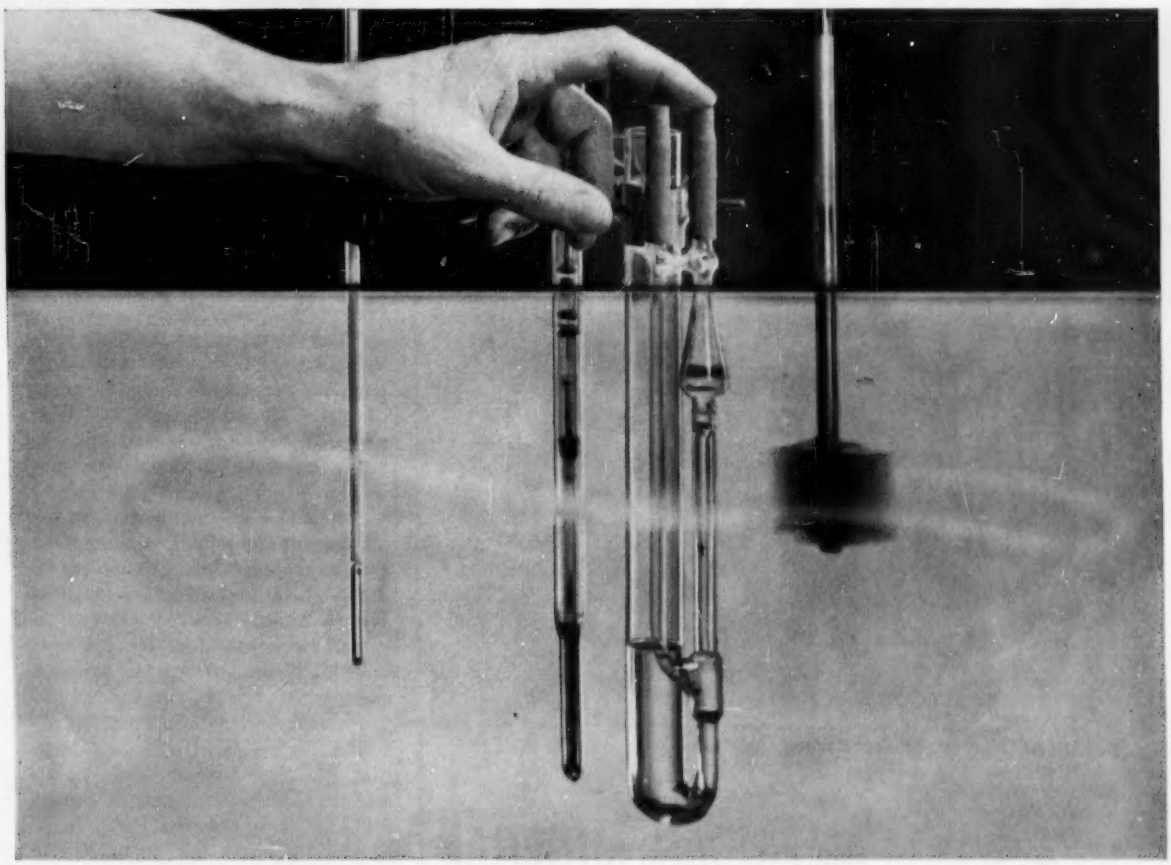
Responsibility for transition of the hill to an economic mine rests with two Mines and Geological Dept. representatives—F. W. Binge (left, below) from Hastings, England, and Kenya-born J. A. Vorster.

While the Kenya government busies itself with scrutinizing bids (from internationally known mining firms) to help "crack the nut," both men are busily burrowing into the prize (helped by a gang of 45 Africans) armed with clattering geiger counters. From the dollops of deposits, samples are dispatched to Nairobi; others to the atomic research center at Harwell, England.

viscosity control

. . . starting point for improved products

maintain uniform viscosity in your product with METHOCEL a synthetic gum



Measuring viscosity of solutions of Methocel in the Ubbeholde Viscosimeter.

Uniformity is important in the material you choose for the vital job of viscosity control. To assure complete uniformity of Methocel® (Dow methylcellulose), production runs of this superior cellulose gum must pass a standard viscosity measurement. Solutions of Methocel are subjected to a very exacting measurement by timing the rate of flow through a capillary type of tube in the Ubbeholde Viscosimeter.

Range of viscosity is important, too. Methocel is available in nine different viscosity types, covering a broad range from 10 cps to 7,000 cps, as measured in 2% aqueous solutions at 20°C. By varying this concentration, an even greater range of viscosities can be obtained.

Viscosity control with Methocel has simplified processing and improved many products. Colorless, odorless, inert and remarkably stable solutions of this gum are also widely used as a stabilizer, thickener, suspending agent, binder and film former. For a free sample or assistance on your specific problem, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. ME 826B-2.

you can depend on DOW CHEMICALS

DOW

AMSCO
Odorless
MINERAL
SPIRITS

manufactured under rigid control to meet exacting specifications

AMERICAN MINERAL SPIRITS COMPANY

230 North Michigan Avenue, Chicago 1, Illinois
155 East 44th Street, New York 17, New York
8600 South Garfield Avenue, South Gate, Los Angeles, California

Service in 48 States

Complete technical data, prices and samples available on request

SMALL FISH are screened off before water is sent

Ichthyologist Paradise

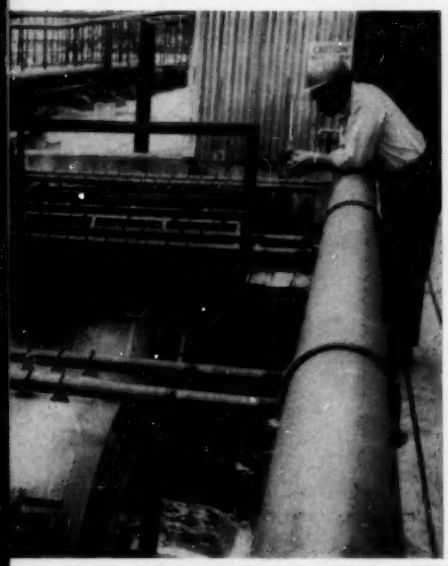
What started out as a strictly business venture in Texas—extracting bromine and magnesium from the waters of the Gulf of Mexico—has been extended by Dow's Texas Division into a top-flight public relations gesture.

Noting that all sizes and shapes of marine life appeared on its intake screens (through which hundreds of thousands of gallons of water flow every minute), Dow volunteered to gather specimens—for both the Museum of Natural History in Houston and the Marine Laboratory of the Texas Game and Fish Commission.

The idea caught on with such speed that the company soon was being asked by other institutions to supply fish—for both research and educational aids. And last year—at the Brazoria County Fair—a Dow Wildlife exhibit was a major display feature.

Wide Variety: Since some 275 different species of marine life exist in the Gulf of Mexico, almost anything can show up on the Dow sea water intake screen. Usual samples include: sting rays, bat fish, Tortugas file fish, spiny box fish, small squid, sea robin, toad fish.

For the most part, specimens are pickled in 10-gal. vats of formaldehyde —but occasionally (as in the case of the Brazoria Fair exhibit) intake operators transfer the fish to containers



power plant, other manufacturing operations.

of sea water—to be displayed live.

Typical of the grateful recipients of Dow marine specimens is Houston Museum director, Robert Vines.

Says Vines: thanks to the Dow gesture, the Houston Museum has immeasurably increased it inventory of Gulf underwater life.

In some cases the reaction is even more ebullient. Chortles one dedicated ichthyologist: "Thanks to Dow, now we even have specimens rare to Texas Gulf waters."

NARROW SHELVES spaced at intervals along screens must be scraped off.

HERE IT IS!

a new solvent
with unusually high flash point (102°F)
extra fast dry time (335°F D.P.)

AMSCO Naphthol Spirits

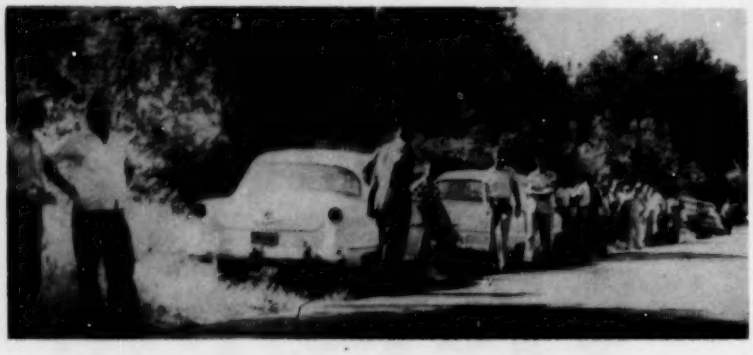
manufactured under rigid control to meet exacting specifications

AMERICAN MINERAL SPIRITS COMPANY

Service in 48 States

230 North Michigan Avenue, Chicago 1, Illinois
155 East 44th Street, New York 17, New York
8500 South Garfield Avenue, South Gate, Los Angeles, California

Complete technical data, prices and samples available on request



CHEMICAL UNION STRIKES: At Chattanooga, CIO asks for recognition (upper left); in Ohio, independent union pickets by poster (above); and in Florida, AFL demands pay rise.

In '55, Money Matters Most

Besides taking the blame for being the root of all evil, the desire for dollars is on the carpet this week as the prime cause of the biggest part by far of the labor unrest that has heckled some parts of the chemical process industries this year.

In other years, numerous chemical strikes were for union security, health and pension plans, and seniority. But of the 16 most important strikes at chemical plants thus far in 1955 (*see table, p. 31*), a clash over higher wage rates was the main issue in eight disputes and was a principal issue in at least four others.

Two strikes were for additional fringe benefits, which of course are also labor costs. One walkout was for improved seniority rules, according to the labor union involved; and another one—still not settled up to last week—is for union recognition.

Time Losses Up: Those are the stated reasons for the chemical work stoppages that—as of this week—already have resulted in more than 500,000 man-days idle in 1955, compared with last year's 159,000 and the 825,000 in 1953 (*CW, June 25, p. 32*).

Of course there are many human and material factors behind every strike, and specific union demands are usually fewer and milder when there's a good general understanding between management and work force. But sometimes the plant workers insist on a sweeping demand or two even though there's a spirit of utter geniality throughout the company.

That seems to be the sort of thing that has been happening at certain chemical plants this year. For the most part, the larger chemical companies have not been coy about their willingness to continue the pattern of 4-to-7¢/hour wage increases that prevailed up into last winter; but unionized employees—in many cases—have asked and struck for wage rises in the 10-to-20¢ range. They've heard or read about such pay boosts in other industries, and they've been told—mostly by each other—that chemical companies were well able to follow suit. (Not always taken into consideration by the big-wage-hike seekers: chemical companies' relatively heavier outlays for research and development, new plants, modernization of equipment, and other costs of keeping up with the competition.)

Caution a Watchword: Not that the chemical labor unions have been pushing their local units into more belligerent tactics. On the contrary, the International Chemical Workers Union (AFL)—which so far has been the pace-setter in this year's strikes—has been taking pains to force its locals to go slow on "hitting the bricks."

It requires each local to submit a long and detailed report on reasons and preparations for a proposed strike before that walkout can be sanctioned by the union's international headquarters at Akron; and the sheer drudgery of filling out this questionnaire is enough to discourage most local officers. Similar procedures are required by the Oil, Chemical & Atomic Workers (CIO) and District 50 of the United Mine Workers.

But this kind of red tape—including a 60-day notice for the company concerned and 30-day notices for state and federal mediation agencies—hasn't stopped a number of locals from striking for ambitious goals.

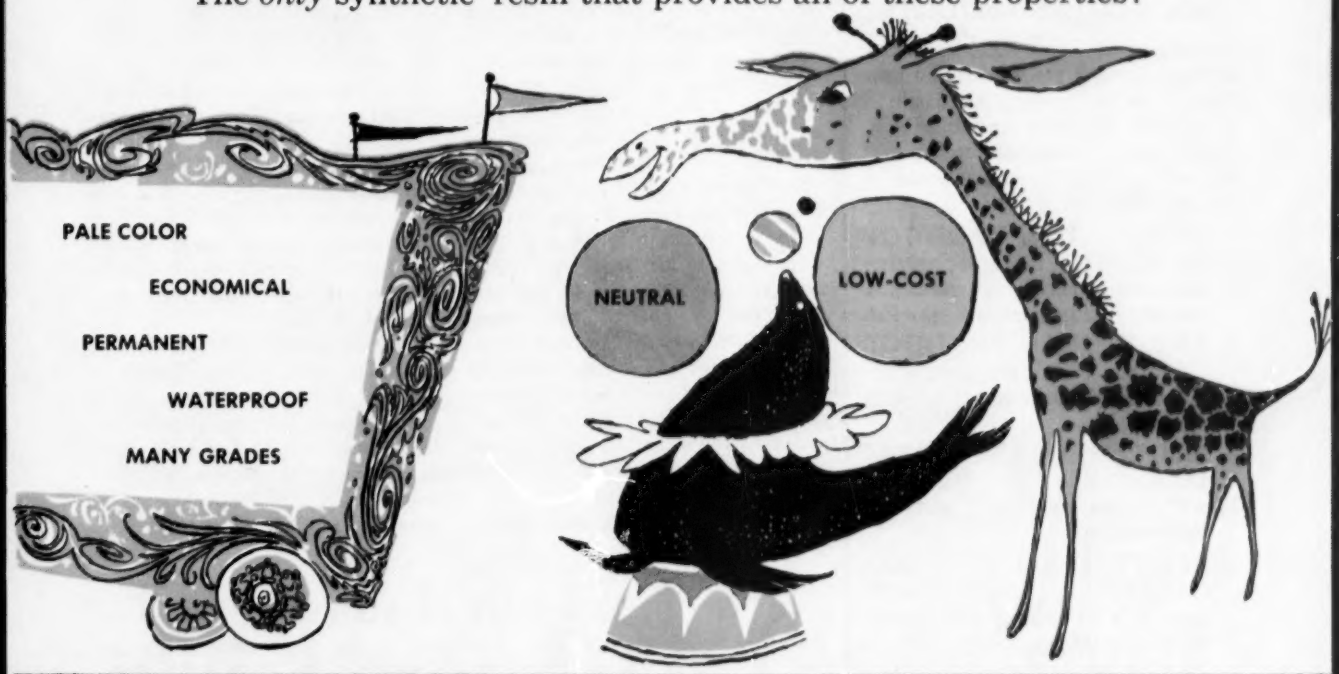
Compromises Common: The year's first big strike in this industry started at the end of January when District 50 and Wyandotte failed to agree on overtime, seniority and wage provisions. This work stoppage ended with a com-

The low-cost resin

with ***SEVEN*** *outstanding advantages*

PICCOLYTE

The *only* synthetic resin that provides all of these properties:



PALE COLOR—Exceptionally light-colored hydrocarbon resin

NEUTRAL—Low acid number—unsaponifiable

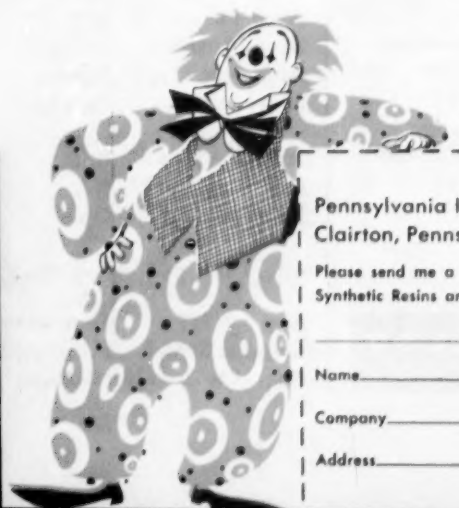
ECONOMICAL—Low in first cost and soluble in low-cost petroleum solvents

LOW-COST—Made by modern process that permits low selling price

PERMANENT — Stable and non-yellowing — unaffected by alkalies and salts

WATERPROOF—Piccolyte resins are unaffected by water or moisture

MANY GRADES—Standard and special grades in melting points from 10° C to 135° C



Pennsylvania Industrial Chemical Corp.
Clairton, Pennsylvania

Plants at:
Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.

District Sales Offices
New York, Chicago, Philadelphia, Pittsburgh, Detroit

PICCO

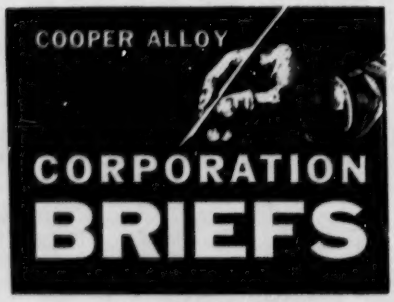
Pennsylvania Industrial Chemical Corp. (CW)
Clairton, Pennsylvania

Please send me a copy of your bulletin describing PICCOLYTE Synthetic Resins and samples of grade for (application)_____

Name_____ Position_____

Company_____

Address_____



• Edited by GEORGE BLACK

NEW CATALOG AVAILABLE

Specifying stainless steel valves or fittings is duck soup with the new Cooper Alloy Catalog. Available in a variety of styles and bindings, Catalog #55 can be custom tailored for every need. Here are some of the possibilities.

1. INDIVIDUAL PRODUCT BOOKLETS . . . 12 pocket size booklets covering off standard valves, fittings and accessories.
2. INDIVIDUAL PRODUCT CARDS . . . All the data from the booklets, printed on separate cards.
3. SIMPLIFIED VALVE CATALOG . . . #55 D — 64 page 6″ x 9″ catalog containing all valve information.
4. SIMPLIFIED FITTING CATALOG . . . #55 F — 32 page 6″ x 9″ catalog containing all fitting information.
5. CATALOG PACKET . . . Catalogs #55 D and #55 F, housed in double pocket folder suitable for holding price lists and technical data.
6. DELUXE CATALOG . . . Bound with twin plastic combs, set inside a hard cover of blue buckram. Contains the 12 individual product booklets; 12 page booklet on valve design, repair and maintenance; 8 page booklet describing the manufacture of valves and fittings and a 16 page reference manual.

For the full story see your local Cooper Alloy distributor or representative, or drop a note to our Public Relations Division.

COOPER ALLOY
HILLSIDE N. J.

promise agreement and a company program—now bearing fruit—to promote smoother relations and better understanding between plant and office.

Next major strike—notable because it was conducted by three different unions at three plants of a single company—came in March, directed at Colgate-Palmolive. This was primarily over wage rates, an issue that was compromised at 8½¢/hour after the unions had first asked a hulking 25-30¢ and the company had offered 6¢.

June was a month fairly bristling with strikes. First and biggest was that of ICWU's Florida locals, which decided to have another try at joint action vis-a-vis eight of that state's big phosphate producers. So far, seven of those companies have settled for a wage increase of about 8½¢/hour now plus an additional 4¢ rise next June. The lone holdout now is International Minerals & Chemical Corp., whose Bonnie plant near Mulberry was dynamited last month. This destroyed the plant's sulfuric acid unit and moved Gov. LeRoy Collins to hint that state officers would step in if needed to preserve order.

Later that month, a nonaffiliated, single-plant union launched what turned out to be a 75-day strike against Columbia-Southern Chemical at Barberton, Ohio. Settlement came last week with a 6% basic wage increase now and an additional 3% boost in each of the four following years of the five-year contract. This was the third big one-plant chemical union to wage a strike this year. Through much of that strike, there was no picketing (*see cut, p. 30*).

Of the more recently started strikes, all have been settled except for OCAW's six-week picketing at the new Cramet titanium plant at Chattanooga, Tenn., in a bid to win recognition as bargaining agent for all production and maintenance workers. The company and the National Labor Relations Board don't go along on that, because fewer than 300 of the plant's ultimate 750-man work force have been hired.

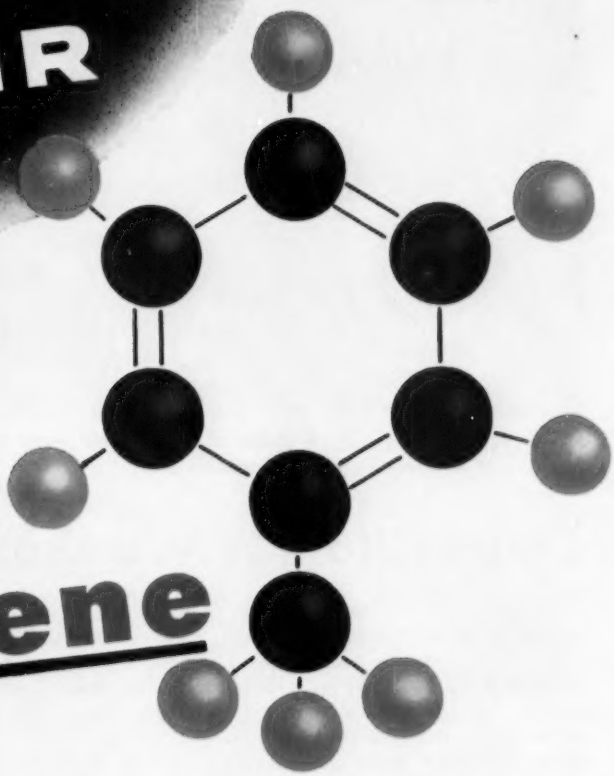
Outlook now is that the worst of this strike season is over, if only because most of the contracts up for renewal this year have now been signed and sealed. And since many of this year's wage pacts were for two-year periods, chances look good for labor peace in '56.

'55's SPATE OF STRIKES

(Strikes at U.S. chemical plants since Jan. 1)

Dates Started and Ended	State	Company	Union	Emply's on Strike
Jan. 10 to Jan. 21	Illinois	Blockson Chemical	ICWU (AFL)	479
Jan. 12 to Feb. 10	Calif.	Maas Chemical	ICWU (AFL)	104
Jan. 30 to April 22	Michigan	Wyandotte	Dist. 50, UMW	2,500
Feb. 9 to Feb. 11	N.J.	Bakelite (UCC)	(Ind. union)	1,700
Mar. 9 to Mar. 28	N. J., Ind. and Kansas	Colgate-Palmolive	(3 unions)	4,450
April 1 to May 8	N. Y.	Lucidol (W&T)	OCAW (CIO)	84
April 12 to May 1	Texas	Dow Chemical	IBEW (AFL)	182
April 28 to May 5	Illinois	Monsanto	ICWU (AFL)	1,612
June 1 to ???	Florida	(8 phosphate producers)	ICWU (AFL)	3,902
June 13 to June 22	N.J.	Du Pont	ICWU (AFL)	1,500
June 17 to June 24	N.J.	Koppers	ICWU (AFL)	90
June 28 to Sept. 12	Ohio	Columbia-Southern	(Ind. union)	1,500
Aug. 1 to Sept. 2	Louisiana	American Cyanamid	OCAW (CIO)	650
Aug. 6 to ???	Tennessee	Cramet, Inc.	OCAW (CIO)	200
Aug. 9 to Sept. 1	N.Y.	Olin Mathieson	OCAW (CIO)	140
Aug. 10 to Aug. 13	Michigan	Monsanto	OCAW (CIO)	400

now from SINCLAIR



Toluol
Xylol
Paraxylene

and Heavy Aromatic Solvents

Do your manufacturing processes call for high-purity aromatic hydrocarbons, including toluol, xylol, paraxylene, and heavy aromatic solvents? If so, Sinclair has the answer to your needs.

Sinclair's newest chemical unit, recently completed at Marcus Hook, Pa., has been especially designed to provide dependable supplies of aromatic chemicals for industry. The operation of this modern Sinclair unit marks another step forward in Sinclair's progress in the petro-chemical field.

Why not investigate this new source of supply *today?* Write or call—

SINCLAIR CHEMICALS, INC.

(Subsidiary of Sinclair Oil Corporation) 600 Fifth Avenue, New York 20, N. Y., Circle-6-3600

STILL NO CHANGE: Fluoridation of major cities' water supplies still lags behind that of medium-small communities, but . . .

Opposition Is Weakening

After a battle—bitterly waged from one corner of the U.S. to the other—it looks this week as if proponents of fluoridation may well rest their heavy artillery. At latest count over 20.8 million Americans were receiving artificially fluoridated water—or approximately one-eighth of the total population of the U.S.; and current surveys now indicate that that figure could easily double within the next several years.

Making the outlook even more promising for fluoridation backers: it now appears that public acceptance has been won. Whereas only six months ago wherever fluoridation came to a public vote it lost more times than it won,* the reverse pattern is true today.

Reason for this change, most observers agree, is that today the voting populace at large is aware that the hard core of resistance to fluoridation rests with a relatively small handful of Americans who (for religious reasons or deeming it a threat to personal freedom) have caused a stir out of all proportion to the merits of their arguments.

Despite professional approval of the country's foremost scientific, medical, and dental authorities, their outraged cries have been long, loud, and articulate. And as a result, a bewildered citizenry has stopped to listen. Some have been puzzled, some have been frightened, some have been frankly talked into a let's-wait-and-see" attitude.

In New York, for example, the controversy over fluoridation has been as sharp as anywhere else in the U.S. Recognizing that fact, authorities have put off consideration of a resolution until much of the hue and cry settles down.

But, as in the case of San Francisco (which completed fluoridation of its entire water system just last month), most city officials agree it's now just a matter of time.

Taking Their Time: Where opposition still exists, fluoridation proponents are still admittedly feeling their way, however. That's what's happening in Colorado—where the Board of Health has launched a study to determine the fluorine count of water scheduled to be introduced into the Denver water system.

If these studies show that the new water supplies (from the state's western slope) are free of fluorine, state heads promise that every effort will be made to introduce fluoridation as soon as possible into the communities concerned.

In Ohio, a recent Supreme Court ruling (that injection of fluorides into public drinking water is not an infringement of constitutional liberties) has cleared the way for fluoridation of Cleveland's water supply by Oct. 1, and has stirred up revived interest in the matter elsewhere. (One example: Akron, where fluorides were used for a few weeks in 1954 until legislation banned their addition.)

In Louisiana (typical of elsewhere in the South), the state Parent-Teachers Assn. has now joined the ranks of those who'd like to see fluoridation adopted on a state-wide basis. Its pledge: to put the matter to a vote within the next six months.

West Coast Hot Box: Fluoridation is still a hot topic in Sacramento, Calif., however. Next Nov. 8, the subject comes up for vote again, but already the propaganda mills are grinding overtime.

And in Utah, although the attorney general's office has ruled that there is no legal or constitutional bar to fluoridation in the Beehive State, pressure to put fluoridation into effect is not soon likely.

Over the rest of the U.S., however, the future for fluoridation has brightened considerably—and though not won, the tide of battle has certainly turned.

* Score last March: fluoridation had been defeated by referendum in 105 communities, approved in 85 others.

Latest Tabulation Shows Big Rise in Fluoridation of Public Water Supplies

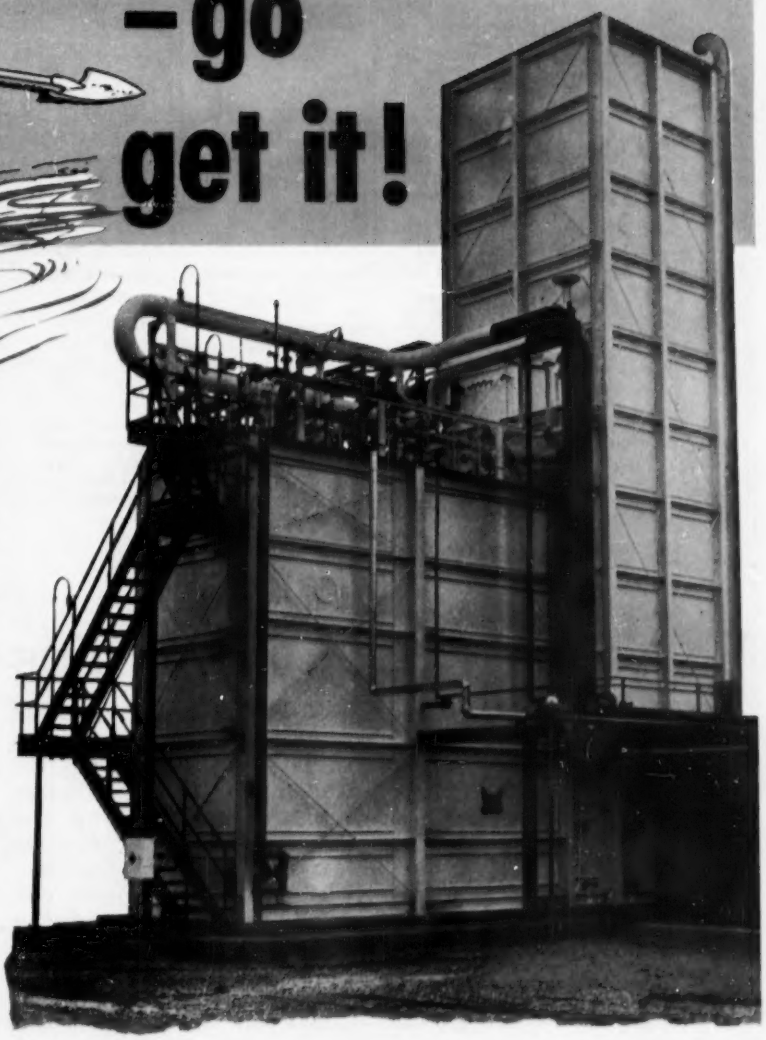
In 1945 . . . 7 communities (population: 212,500) had sanctioned fluoridation.

By 1950 . . . 94 communities (population: 1,285,000) had voted fluoridation in.

BUT

Today . . . 1,097 communities (population: 20,890,500) are drinking fluoridated water.

There's gold in your off-gases and fluid flows -go get it!



Your "waste" gases, fluid flows, the very air around you, contain wealth that can be yours through low-temperature processing. Known as "applied cryogenics", this method recovers valuable by-products at lowest possible cost.

In low-temperature processing (0° to minus 450°F.) the gas mixtures are liquefied by utilizing the "cold" produced by expanding compressed fluids. Valuable products are then separated by fractional distillation.

Air Products, Incorporated, specializes in low-temperature processing. The company has designed, built and put into successful operation more than 700 plants for this method of gas separation. The extensive know-how gained in this work by our engineering and manufacturing personnel is available to you. If you wish to explore the possibilities in the purification of refinery gas, natural gas, or any hydrocarbon-rich stream, consult us. After investigation we will furnish a preliminary engineering analysis, or a complete process design. Let us have an outline of your problem. It will not obligate you in any way.

Free 36-page brochure describes broad possibilities of low-temperature processing. Send for it.

Air Products
INCORPORATED
Dept. J , Box 538, Allentown, Pa.

Specialists in Low-Temperature Processing

Cost Analyses • Process Design • Apparatus Design • Apparatus Manufacture

COMING UP THIS FALL . . .

New Readings of Industry's Ground Rules

(Process company cases pending before Federal Trade Commission)

The Company	The Charge	Status of Case	The Company	The Charge	Status of Case
Crown-Zellerbach Corp.	That C-Z violated antimerger law by buying up St. Helens Pulp & Paper Co.	Hearings reopen Nov. 7 with a 3-week session in San Francisco.	Paint Dealers Institute of America	That the institute and six trade associations conspired to force paint manufacturers to sell only to recognized dealers	Associations have denied the conspiracy. No hearings set.
Evis Mfg. Co.	That Evis used "false and misleading" advertising for its water softeners.	Company begins its defense in hearings scheduled to reopen in October.	Pillsbury Mills, Inc.	That Pillsbury violated antimerger law by acquiring assets of two milling competitors.	Hearings reopened Sept. 19 in Nashville and will later move to Memphis and Oklahoma City.
Kordol Corp. of America	That Kordol advertising exaggerates effectiveness of Kordolin tablets.	Hearing examiner has ruled Kordolin ads illegal, finds product contains less salicylamide than ordinary aspirin tablets.	Pioneers, Inc.	That Pioneers used "false, misleading" advertising claims for its battery additive AD-X2.	Hearings reopened Sept. 20 in Washington for 4-day rebuttal evidence by FTC lawyers.
LeBlanc Medicine Co., Inc.	That LeBlanc used "exaggerated and false" claims for Kary-On, a vitamin and mineral supplement.	Hearings were scheduled for Sept. 27, but company won extension to Oct. 1 for filing answer.	Union Bag & Paper Corp. and Hankins Container Co.	That Union Bag violated antimerger law through purchase of Hankins stock.	Hearings scheduled to open Oct. 18.

Fast Start to Confute Critics

Like the ticket-issuing zeal of a rookie cop, the burst of activity with which the Federal Trade Commission is opening its fall and winter season shows a feeling of being watched and a desire to build a reputation.

On merger, monopoly, unfair competition and false advertising regulations, FTC's current case load involves a number of chemical process companies (*see table, above*). The decisions to be arrived at in these cases will serve as markers for the rest of the industry.

And in handling these cases and others that are now in investigative stages, FTC's commissioners and staff can hardly help but be aware of these political realities:

- This will be the Republican-controlled FTC's last full term before next year's Presidential election.
- The agency is under fire from the Democrats for alleged laxity in enforcing laws for industry.

Criticism on Mergers: Democratic Rep. Wright Patman, for example, is berating the GOP-directed FTC for not being more active on the merger front. He laments that only five complaints have been issued under the five-year-old antimerger amendment to the Clayton Act, and that only 6% of FTC's budget was used for antimerger work during the past fiscal year, although there were 522 corporation mergers by companies having more than $50 million in assets.

In answering such criticism, the GOP can point to the record number of cases decided by FTC last year (*CW, Aug. 27, p. 13*); the reduction in backlog and waiting time of current cases; and the fast start the commission is making on this year's docket.

During the past fortnight or so, FTC has cleaned up a batch of "false and misleading advertising" cases against makers and sellers of drugs, insecticides, and water conditioners.

Consent Settlements Favored: On bigger cases, the commission's fall calendar of hearings is pretty well whipped into shape. While most of the cases listed in the table (*above*) probably will have to be thrashed out in hearings, FTC is making increasing use of consent settlements. In all of the following cases, the companies agreed voluntarily to stop certain advertising claims without litigation:

- Odor-Aire, roach blocks.
- Edanol vitamin product.
- Nestea instant tea.
- Clean House anti-insect cones.
- Arthonul drug preparation.
- ViViBx drug product.
- Deeminac and Deeminizer water demineralizers.

FTC is opening its new season with a new chairman, John Gwynne, and a new member, Sigurd Anderson. Their fast start this fall term and their frequent use of consent procedures indicate how the commission may try to confute Democratic critics without antagonizing business too much.

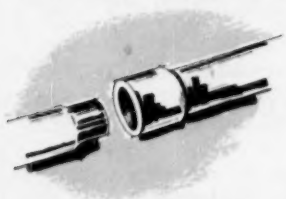
the NOPCO DIGEST

Short-short stories of Better Products, Improved Production Methods, Reduced Costs brought about by NOPCO CHEMICALS for PRODUCTION

LESS STATIC... LESS DOWN-TIME IN TEXTILE MILL

A New England producer of synthetic fibers had almost as much "down-time" as running time. They could not find a lubricant that would process these fibers. Tried new equipment; still no go. Nopco developed lubricants that gave the proper balance of fiber-to-fiber lubricity, fiber-to-fiber cohesion, antistatic control. The mill has had high production ever since.

YOU CAN CORRECT A MISTAKE WITH THIS COUPLING



A maker of transite pipe had long needed a coupling lubricant with a hard-to-find combination of properties. It had to be non-toxic—the pipe carries drinking water. It had to be water-soluble, so that the excess could be washed out. It had to retain its lubricating properties for an hour after the pipe is laid—so that it could be separated if the pipe was laid wrong! And it had to hold a constant viscosity in temperatures from below freezing to 140° F.

Several firms tried—the manufacturer has now standardized on KBE, the lubricant Nopco developed to meet his requirements.

PAPER MACHINE NO KIN TO LEOPARD

The fourdrinier machine in a Minnesota paper mill had to shut down and wait for help. Since they had shifted to a new sizing material that did the job they wanted on a fine grade of wallpaper, they found the paper was picking up spots caused by foam. Nopco technicians spent several days at the plant—after trying several Nopco defoamers, found the right combination. The high speed fourdrinier resumed operations. No more spots.

The case-histories briefly described here are recent examples of Nopco *Chemicals for Production* at work helping turn out improved products better, faster, cheaper.

We realize that the problem *you* would most like to solve may be quite different from any of these. Nopco has a wealth of experience in many other fields as well—and has built its business by coming up with a high percentage of the right answers in improving other people's products. Why not call on our technical men to have a try at yours?

Nopco Chemical Company, 224 Davis St., Harrison, N. J.

Attention Research Men

A new Nopco chemical, a modified non-corrosive alkyl aryl polyether alcohol, with a low unchanging viscosity curve when diluted with water at 25°C.—we have been recommending as an excellent detergent for wool. We can see that its properties may easily make it useful in several other fields. If you would like a free testing sample for your own experiments, write us today.

Chemicals for Production

NOPCO

PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif.
London, Ont. Canada

Nopco Processing Chemicals include: Esters, Ethylene Oxide Condensates, Amides, Metallic Soaps, Sulphonates, Emulsion Polymers, Foamed Plastics.

For: LUBRICATION • DETERGENCY SIZING • PLASTICISING • EMULSIFYING • DISPERSING • WETTING DEFOAMING • THICKENING.

Quality Makes the Difference

In your race for customer acceptance, make use of all help possible — where OLEIC ACIDS are needed, try A. Gross & Company's light-colored OLEIC ACIDS (RED OILS). Titres running as low as 1-3°C. are now available. In addition, low titre WHITE OLEINE is obtaining wide trade-acceptance.

RED OILS with as much as 1% higher free fatty acid content than competitive oils — RED OILS that are ester-free — these are the results of constant effort and application of Gross know-how.

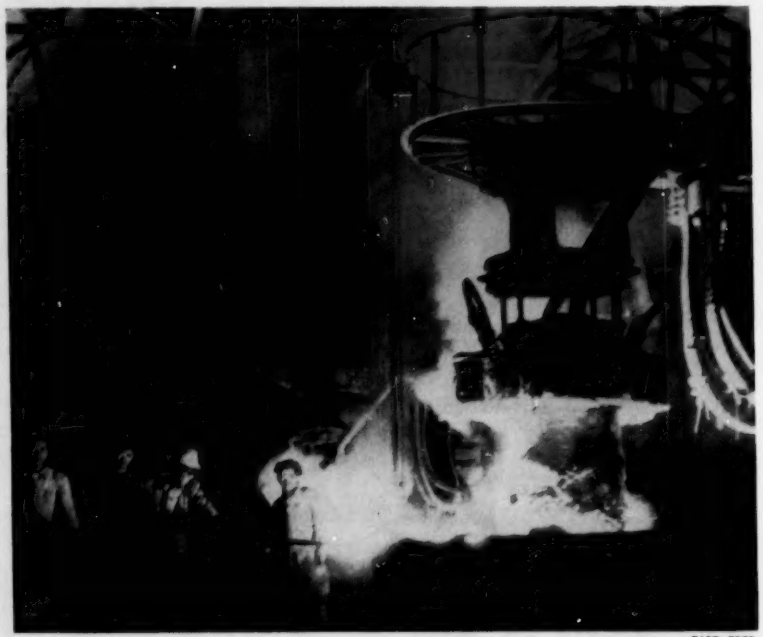
Send for our new catalog "Fatty Acids In Modern Industry".

	White Oleine GROCO 6	Red Oil GROCO 4
Titre	2°—6°C.	4°—6°C.
Cloud Point	35°—43°F.	42°F. max.
Color 5¼" Lovibond Red	1 max.	—
Color 5¼" Lovibond Yellow	10 max.	—
Color 1" Lovibond Red	—	2 max.
Color 1" Lovibond Yellow	—	15 max.
Color Gardner 1933	2 max.	—
Unsaponifiable	1.0% max.	1.5% max.
Saponification Value	199 — 204	198 — 203
Acid Value	198 — 203	197 — 202
% F.F.A. as Oleic Acid	99.5 min.	99 min.
Iodine Value (WIJS)	95 max.	95 max.
Refractive Index 50°C. (Average)	1.4500	1.4500

a. gross

MANUFACTURERS SINCE 1837

295 MADISON AVENUE, NEW YORK 17, N. Y.
FACTORY: NEWARK, N. J.
DISTRIBUTORS IN PRINCIPAL CITIES



EAST FOTO

BON GUNG: Fertilizer units are now producing at prewar levels.

FOREIGN. . . . . .

Fertilizer/North Korea: In reports seeping out of North Korea this week, it would appear that chemical companies north of the 38th parallel are again close to prewar production levels.

Fertilizer companies, in particular, have been given a strong assist via government subsidies; current plan is to double the government's investment in agricultural chemical projects in 1956.

Here (*see cut, above*) at the Bon Gung Chemical Works, particular progress is said to have been made recently. Output (chiefly of ammonium nitrate), the reports claim, has been tripled during the past 12 months.

•

German-Indian Trade: In the battle of coal-tar exports to India, it would now appear that West Germany has won a decisive first-round victory.

According to Indian manufacturers, the "high excellence of German products coupled with a sound knowledge of Indian requirements," has enabled German distributors to oust well-entrenched ICI—despite a preferential duty on U.K. imports (20% as against 26½% for German imports). Moreover (say the Indians), German firms are prepared to give long-term credit, their deliveries are prompt, their prices competitive, and their wrapping and products better than those of other nations.

Result: Over a third—valued at over $10 million—of India's total purchases of 15 million lbs. of coal-tar dyes last year were obtained from West German manufacturers.

•

Newsprint/India: Word from a Swedish trade mission in India indicates that Russia and China are about to crowd other exporters out of the Indian newsprint market.

Russia and China not only are able to offer low price and short delivery time, the report states, but have also recently considerably improved their product.

Meanwhile, Sweden is watching its own newsprint interests in India (2,500 metric tons/year).

•

Japan-Formosa Trade: Japanese businessmen returned to Formosa last week with a one-year contract (retroactive to Aug. 1), under which Japan will sell 284,000 tons of ammonium sulfate to Nationalist China.

Further: the Japanese have agreed to increase their exports to 330,000 tons—if they can increase their own output at home. (Japan has restricted exports of ammonium sulfate until domestic production caught up with demand.)

Q. *Could chemical science find a way to increase the heat resistance of polyethylene for greater usefulness?*

A. ELECTRON BOMBARDMENT GIVES POLYETHYLENE AMAZING NEW PROPERTIES

Another example of

GE

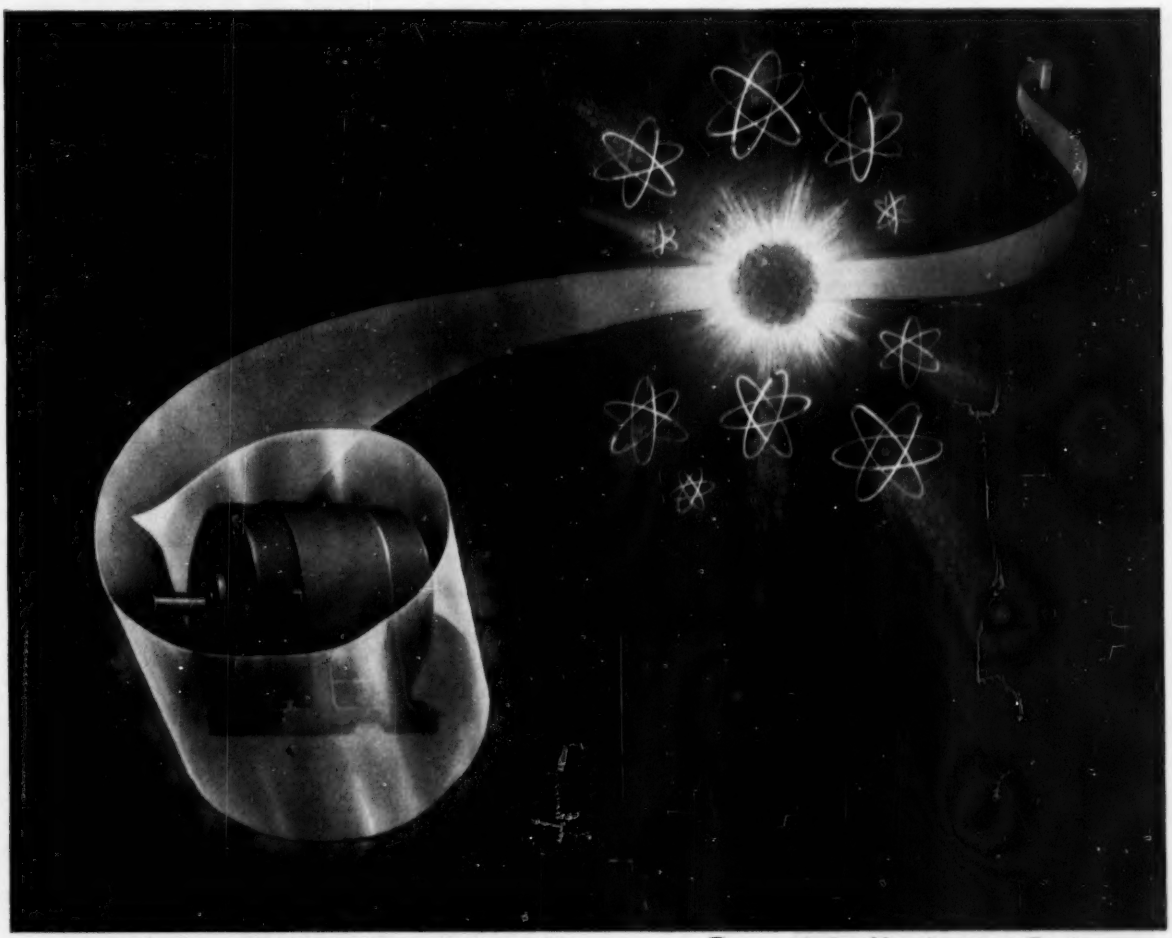
CHEMICAL PROGRESS

It's called radiation chemistry—this new G-E technique of bombarding plastics with high-energy electrons to create useful new properties.

For example, General Electric is applying it—for the first time—to make polyethylene film suitable for electrical insulation. G-E *Irrathene® 201* irradiated polyethylene film has all the excellent insulating properties of conventional polyethylene, but it does *not* melt at elevated temperatures.

Irrathene holds tremendous promise for industry—not only in the electrical field, but for protective pipe-wrappings, hot-food packaging films . . . anywhere that heat-resistant polyethylene is useful.

You'll be hearing more about radiation chemistry from G.E. It's another example of progress for all—through G-E *chemical* progress.



For new developments in Plastics Compounds, Silicones, Electrical Insulating Materials, Industrial Resins and Varnishes, Plastics Laminating and Molding . . . write for "G-E Chemical Products" booklet (CDG-101) to: *CHEMICAL and METALLURGICAL DIVISION, General Electric Company, Section 1500-5B, Pittsfield, Mass.*

Progress Is Our Most Important Product

GENERAL GE ELECTRIC

For the **SAFETY** *of your products*

with service to your specification

Special hi-bake liners keep your products constant, free from rust or corrosion. Whether your product is due for immediate use or long storage, it will remain the same as the day you packaged it.

This safety is insured by the high grade steel and liners used in SSirco drums. They're built to take a pounding, almost indefinitely, without danger of seepage or leakage. SSirco's modern drum plant, located in Birmingham, is equipped to degrease, clean, phosphatize and silk screen, in addition to baking all types of liners for the chemical industry.

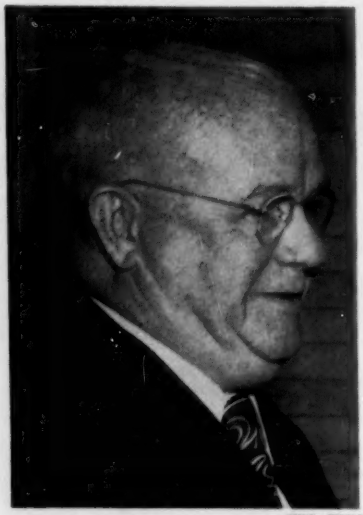
We shall be glad to work with you to your specifications and on all delivery requirements. SSirco drums are available in 30 and 55 gallon capacities. For full details, contact either our Birmingham plant or Savannah general office.

Color decoration silk screened to specification for Glidden Paint Co.

CONTAINER DIVISION

SOUTHERN STATES IRON ROOFING CO.

SALES OFFICE: Savannah, Ga.
PLANT: Birmingham, Ala.



WIDE WORLD

AFL'S GRAY: In new phosphorus plant, an age-old interunion hassle.

LABOR. . . . . .

Clash over Jobs: A phosphate plant in Florida has been the scene of an interunion dispute that illustrates an issue that some labor observers feel may wreck the forthcoming AFL-CIO merger. It's the old conflict between "craft" unions and "industrial" unions, and this is how it cropped up at the American Agricultural Chemical Co.'s phosphate works at Pierce, Fla.:

When members of Local 33, International Chemical Workers Union (AFL), returned to work after their recent strike, some of them were assigned to help construct a new unit for the plant. This brought picketing by members of the Hillsborough and Polk County Building Trades Council (AFL), which contends that there was an agreement among all the labor unions in the area that new construction work would be done by craft union members. A spokesman for ICWU Local 33 replied that his members were qualified for this work and that the work was covered by their new contract. The company is neutral, hopes the work gets done on schedule.

The AFL craft unions—particularly the ones grouped together in the Building Trades Dept. headed by Richard Gray—have been cool toward industrial unions since before the original CIO unions broke away from the AFL 20 years ago; and this lingering animosity may prove to be a built-in weakness in the AFL-CIO reunification this December.

Elections Split: In the biggest chemical process plant election so far this month, production and maintenance employees of Chemstrand's nylon plant at Pensacola, Fla., voted more than 4 to 1 against union representation. They cast 2,296 ballots for "no union" and 563 for the Pensacola Metal Trades Council (AFL). The AFL says it'll make another try for the checkers and laboratory technicians.

Another recent plant election came out as a victory for the United Stone & Allied Products Workers (CIO) and a setback for the International Union of Mine, Mill & Smelter Workers (CIO). By a vote of 230 to 207, production workers employed by Potash Co. of America at Carlsbad, N.M., broke away from Mine-Mill—which had represented them for 17 years—and affiliated with the Stone Workers. Mine-Mill—which formerly represented virtually all potash workers at Carlsbad—now has only one bargaining unit there, about 500 production employees of International Minerals & Chemical Corp. (*CW, Sept. 17, p. 18*).

LEGAL. . . . . .

State Additive Laws: Wisconsin—which has been one of the states with close restrictions on use of chemical additives in foods—has recently adopted two new laws liberalizing the former code. One of the bills signed by Gov. Walter Kohler permits the use of benzoic acid or benzoates—in quantities up to 1/10 of 1%—as a preservative in jams, jellies and certain other foods. The other new law authorizes the use of sulfur dioxide or sulfites—up to 350 parts per million—in the processing of dried or frozen fruits.

•

Law Enforcement Chemists: New methods of checking on compliance with state and federal regulations on fertilizers, pesticides, drugs, cosmetics and other goods will be the theme of the 69th annual meeting of the Assn. of Official Agricultural Chemists in Washington's Shoreham Hotel Oct. 10-12.

•

Pricing Order Killed: With one blow, U.S. District Judge Alexander Holtzoff at Washington, D.C., has toppled the Federal Trade Commission's

what's your SODIUM I.Q.?

how much do you know about this valuable building block of industry?

Sodium, today, has literally dozens of useful applications in industry. And more are being developed constantly.

How many do you know? How many are helping to simplify, speed up or reduce the cost of your processing? The literature shown below will answer many of your questions.

We suggest you check the items that are not in your library. Cut out the question box below, clip it to your letterhead, mail it to Ethyl Corporation, 100 Park Avenue, New York. We'll send you copies promptly.

Question	For the Answer	Check Here
How do you handle sodium?	"Handling 'Ethyl' Sodium"	☐
How small can it get?	"Sodium Dispersions"	☐
What metals will the hydride descale?	"Sodium Hydride Descaling"	☐
What are the uses of sodium azide and how is it made?	"Chemistry and Uses"	☐
What alcoholates will it make?	"Sodium Alcoholates"	☐
How does it react with ammonia to produce the amide?	"Sodium Amide"	☐
How many alloys are possible?	"Sodium Alloys"	☐
What uses can be made of the hydride?	"Sodium Hydride"	☐
What fatty alcohols will it produce?	"Fatty Alcohols for Industry"	☐
How can alkyl sodium compounds be used?	"Alkyl Sodium Compounds"	☐
What new uses for sodium acetylides?	"Sodium Acetylides"	☐

ETHYL CORPORATION

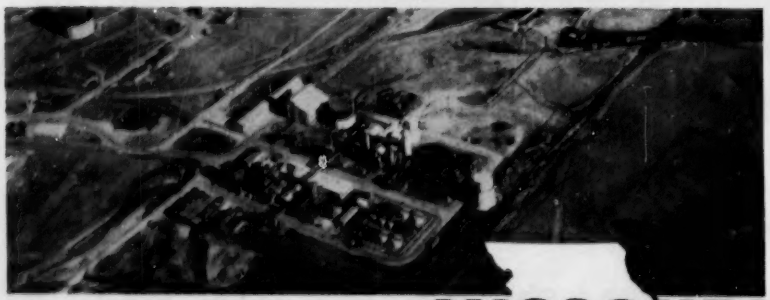
Chemicals for industry

100 PARK AVENUE, NEW YORK 17, N.Y.

ATLANTA, BATON ROUGE, CHICAGO, DALLAS, DAYTON, DENVER, DETROIT, HOUSTON, KANSAS CITY, LOS ANGELES, NEW ORLEANS, PHILADELPHIA, PITTSBURGH, SALT LAKE CITY, SAN FRANCISCO, SEATTLE, TULSA, MEXICO CITY & (ETHYL CORP. OF CANADA LTD.), TORONTO

Why Chemical Processors

like Hercules Powder



are moving to MISSOURI

A $6,000,000 plant now being built at Louisiana, Mo., is typical of the great expansion in chemical processing in Missouri. When top management of Hercules Powder company began looking for a plant location to produce pentaerythritol, it is significant that they chose the site of the Missouri Ammonia Works, testimonial to the markets and resources you find here.

Now, 16 Missouri cities are ready to "tailor-make" a plant to your plans—80 other Missouri cities forming industrial corporations to assist industry. Or you can choose from 132 industrial buildings now available.

Vast water resources for present or future expansion. In addition to the Missouri and Mississippi rivers and countless clear water streams, Missouri offers mineralized waters and artesian water of great softness.

Leader in lead, limestone, soybeans and other necessary raw materials for chemical processing—as well as natural gas, coal and oil for fuel, and electric power beyond present needs.

Large labor pool that leads in the variety of skills available, and with an enviable labor-relations record.

Let us give you more facts about Missouri.

PHONE COLLECT—
Jefferson City 6-7185
or write Dept. 1585
James D. Idol, Industrial Director
Missouri Division of Resources & Development
Jefferson City, Missouri

WIDE WORLD

JUDGE HOLTZOFF: For manufacturers, new freedom on discounts.

three-year-old order limiting the discounts that tire manufacturers and distributors can grant to big retailers. Holtzoff holds that the order was not in accord with the Robinson-Patman Act, which establishes pricing standards for interstate trade. While the order itself applied only to tire manufacturers, Holtzoff's ruling—unless reversed by higher courts—will deter FTC from issuing similar orders restricting discounts in other industries.

KEY CHANGES . . .

Paul W. Bachman, to vice-president and director, research and development, The Koppers Co., Inc. (Pittsburgh, Pa.).

Clarence E. Larson, to vice-president, research, National Carbon Co. (Cleveland, O.).

Solomon Epstein, to general manager, and **Charles Fuchs,** to vice-president, research and development, Emulsol Chemical Corp. (Chicago).

George J. Duffy, to general manager, Minerals and Chemicals Division, Godfrey L. Cabot, Inc. (Boston, Mass.).

William T. Hack, to president, Snyder Chemical Corp. (Bethel, Conn.).

DIED . . .

Edwin Letts Oliver, 76, founder-chairman, Dorr-Oliver Inc. (Stamford, Conn.), at Lake Tahoe, Calif.

BECKMAN INFRARED NOTES

We are pleased to announce that the Liston-Becker Instrument Company has just been purchased by Beckman Instruments, Inc.

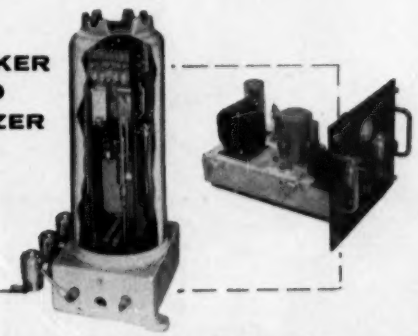
■ The Liston-Becker Company has earned the reputation of being the foremost manufacturer of infrared gas analysis equipment. Their analyzers have found widespread application in research and process control in such industries as chemical and petroleum.

■ New instruments are constantly being developed in Beckman's own research laboratories, but it is also the policy of the company to acquire instruments of outstanding merit developed by others when such instruments will enable us to provide more complete instrumentation to our customers.

■ Beckman's own experience in infrared instrumentation includes the design and manufacture of the first commercially available model used for the vital synthetic rubber program during World War II. Beckman is also the manufacturer of today's outstanding research infrared spectrophotometer, the IR-3, which is finding application in such diverse fields as medicine, petroleum, agriculture, chemistry, etc.

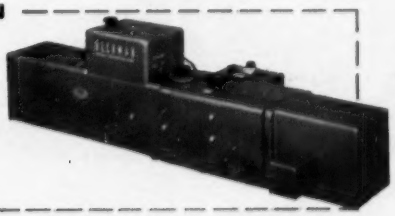
■ The combined research development and production facilities of the two organizations offer the customer the most up-to-date and complete line of industrial infrared equipment available.

LISTON-BECKER INFRARED GAS ANALYZER



for continuous quantitative analysis of process gas streams. Measure, record, or control the concentration of a single component within a multi-gas stream, or the total concentration of groups of components in the stream by means of a Liston-Becker Gas Analyzer. For descriptive literature and application information, request data file **66B-17.**

BECKMAN IR-2A

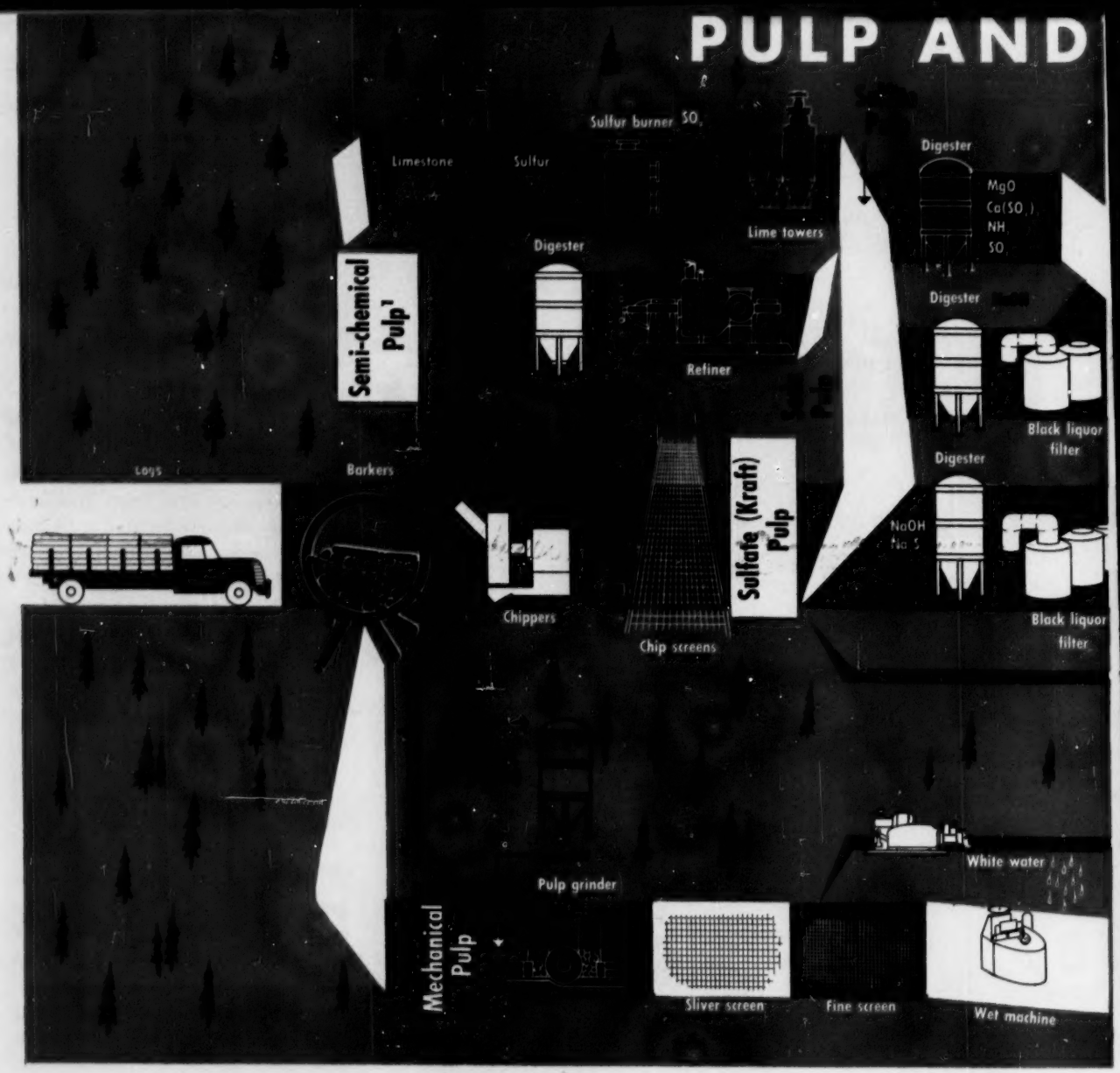


the ideal instrument for the laboratory requiring a high performance instrument for both research and quantitative analysis. It offers unsurpassed accuracy, stability, versatility, and ease of operation at surprisingly low cost. Slit cam recording system gives transmittance type data presentation automatically. Write for data file **66B-17.**

Beckman division

BECKMAN INSTRUMENTS, INC.

Fullerton 1, California



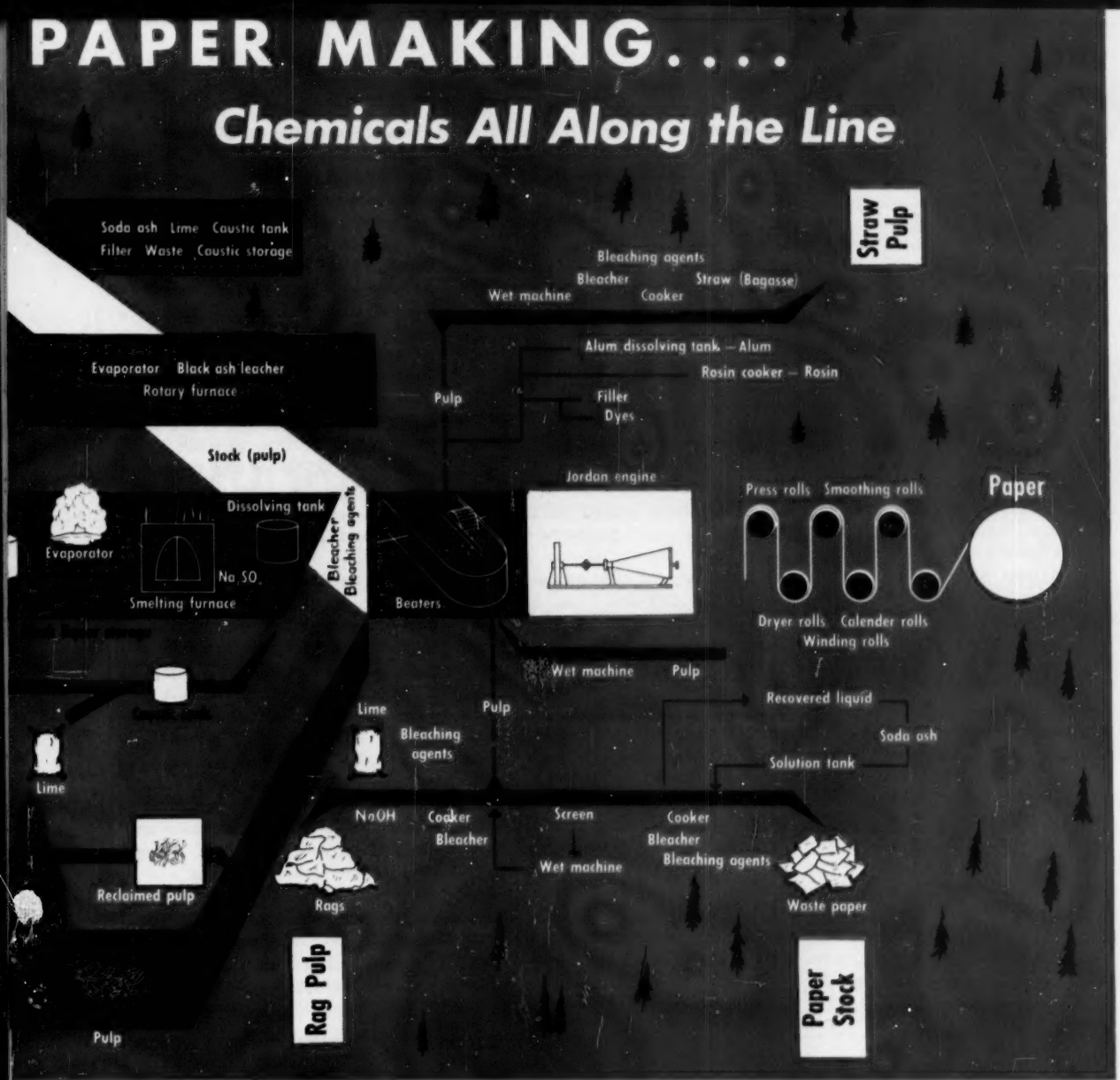
C W Report

by John B. Calkin and Robert Frank

Pulp and Paper: From Rags to Riches

PAPER MAKING....

Chemicals All Along the Line



Fast-paced consumption pushed the paper industry into record sales and production figures last year, and it expects to rewrite them this year, and double them by 1975.

Getting in stride, sales of paper processing chemicals also set a new mark of $0.25 billion, are reaching for a record $0.5 billion.

Over-all outlook is optimistic, backed by high capital outlay and swift-striding technological advances.

Spurred on by numerous technical developments and new consumer applications, United States' production of paper and paperboard last year rose to a record 26.7 million tons and sales set a new high of $8,738 million. What's more, paper men predict new records for 1955 and that by 1975 production figures will pass the 50-million-tons/year mark. Today, the paper industry, on its way up the ladder, ranks number five among the nation's top industries.*

Setting the pace for this record climb is the highest per capita consumption of paper and paperboard in the world (*see box: Paper Consumption*)—last year 384 lbs. per head, or almost 800 lbs. of wood for each individual. More people are using more paper products for more purposes than ever before. Witness: in 1900, per capita consumption was about 60 lbs., and today it is almost six and a half times that; in 1900, less than 20 recognized, different types of paper and paperboard were being made, and today there are about 170 different types. Moreover, only a few years back, many of today's uses, such as magnetic recording paper, laminated and honeycombed paper for building panels, and paper swim suits, were unheard of.

* In value of shipments made.

C W Report

At the same time, metal foils and plastics, despite their higher cost, are making serious inroads on packaging, one of the paper industry's major markets. Yet the demand for paper and paperboard continues strong. Total U. S. consumption last year hit a near-record high of 31.2 million tons (just 0.2 million tons under 1953's high) and this figure is expected to double by 1980. At one Southern mill, for example, total output through 1960 has already been sold.

To keep pace, new paper and paperboard capacity is bounding ahead at an average 1-million-tons/year clip. This year, total U. S. capacity reached approximately 30 million tons/year. Yet there hasn't been a corresponding increase in the number of new plants. Most of the added capacity appears to be coming from bigger mills rather than from more mills. For example, in 1939-1947, there was only 7% rise in the number of operating mills (from 832 to 891) but the value of output jumped 320%.

Southern Stronghold: Ranging from Alaska to the Deep South, this expansion has touched all parts of the nation. Over the past 25 years, each region has pushed ahead in the production of paper and paperboard. The greatest gains have been scored in the South, both in percentage points and in actual tonnage produced. Among the many reasons for this, these are some of the more basic ones:

- Development of the kraft process opened up the Southern pine forests theretofore considered unsuitable for pulping.
- Discovery of ways to bleach kraft pine pulp widened the earlier market wedge.
- Southern pine grows about twice as fast (about a cord per acre per year) as Northern pulpwood species.
- Large reserves of trees, together with capacity for even greater growth, are readily available.
- Abundant labor and a lower wage scale attracted the industry to the South. (Today, the paper industry wage scale in the South and West exceeds that in the North.)

The West, still lagging in actual output, meanwhile has edged into second place on percentage gains. Contributing factors to this have been the large tree stands and the high cruise per acre in the Pacific Northwest (e.g., 80-100 cords compared with 5-25 cords/acre in the South) and the development of the West as a major market for the paper industry's output.

There are, of course, other factors that bear upon this positioning: regional consumption of pulpwood, for example, has increased all along the line, but again the South leads the way and the West is next.

Then there is the matter of integration. Ever since the switch from rags to wood as the principal raw material for paper pulp shortly after the middle of the 19th century, paper men have been moving into the forests to join the pulp producers. Still, there are more than 300 nonintegrated mills, located largely in the Northeast and North Central states. Most of them look to specialty-grade output for their survival.

Moving Up, Down and Over: But by and large, the accent today is ever more on integration and diversification: integration to offset the high and rising costs of capital investments, materials handling, and transportation; diversification to meet the challenge of waste disposal and, more important, to help offset the inroads made by the newer plastics and the like. All top 10 U. S. and Canadian firms have expanded vertically and/or horizontally (*see box: Top 10*).

First-place International Paper Co., for example, has taken over Commercial Alcohols Ltd., a Canadian firm that makes specialty chemicals and insulation as well as alcohols. Among other leading paper companies:

- Crown Zellerbach Corp. is moving into production of plywood and dimethyl sulfide. The latter, at the rate of 2 million lbs./year, will be derived

Text continues on p. 51

Meet the Authors

ROBERT FRANK (*left*) had his debut in CHEMICAL WEEK last year (*Oct. 30, p. 33*) as the author of "Sulfuric Acid: The Decade Ahead." Since then, his continuing interest in sulfuric's fortunes has led him into the paper industry and, in turn, to his current reappearance. He consults privately, is associated with Foster D. Snell, Inc.

JOHN B. CALKIN, a newcomer to CHEMICAL WEEK, is an old hand in the pulp and paper field. A graduate chemical engineer, he began his career with Brown Co., worked for Dennison Mfg. Co. and Union Bag & Paper Corp. Among his extravocational activities, he has been chairman of many TAPPI committees, has served as secretary of University of Maine Pulp & Paper Foundation. At present Calkin is assistant to the president and director of marketing and economic research at Foster D. Snell.

● The louvred roof of the cabana area of the Miami Airways Hotel, Miami, Fla. consists of translucent corrugated sheets of polyester resins.

● Polyester sheets were used as skylights for the 4,025 sq. ft. area of the new Henry Miller Spring and Manufacturing Company building, Pittsburgh 15, Pennsylvania.

● A flat pane of polyester resin glazing sheets being installed in a metal window frame. The unbreakable material does not need the careful handling of glass.

Polyester resin sheets, corrugated or flat, bring daylight indoors — keep weather outdoors. As a glazing material for industrial plants and warehouses, as roofing and siding for cabanas, patios, resort cafes, grandstands, etc., brightly tinted Polyester resin sheets welcome the light, but keep the sunshine "cool."

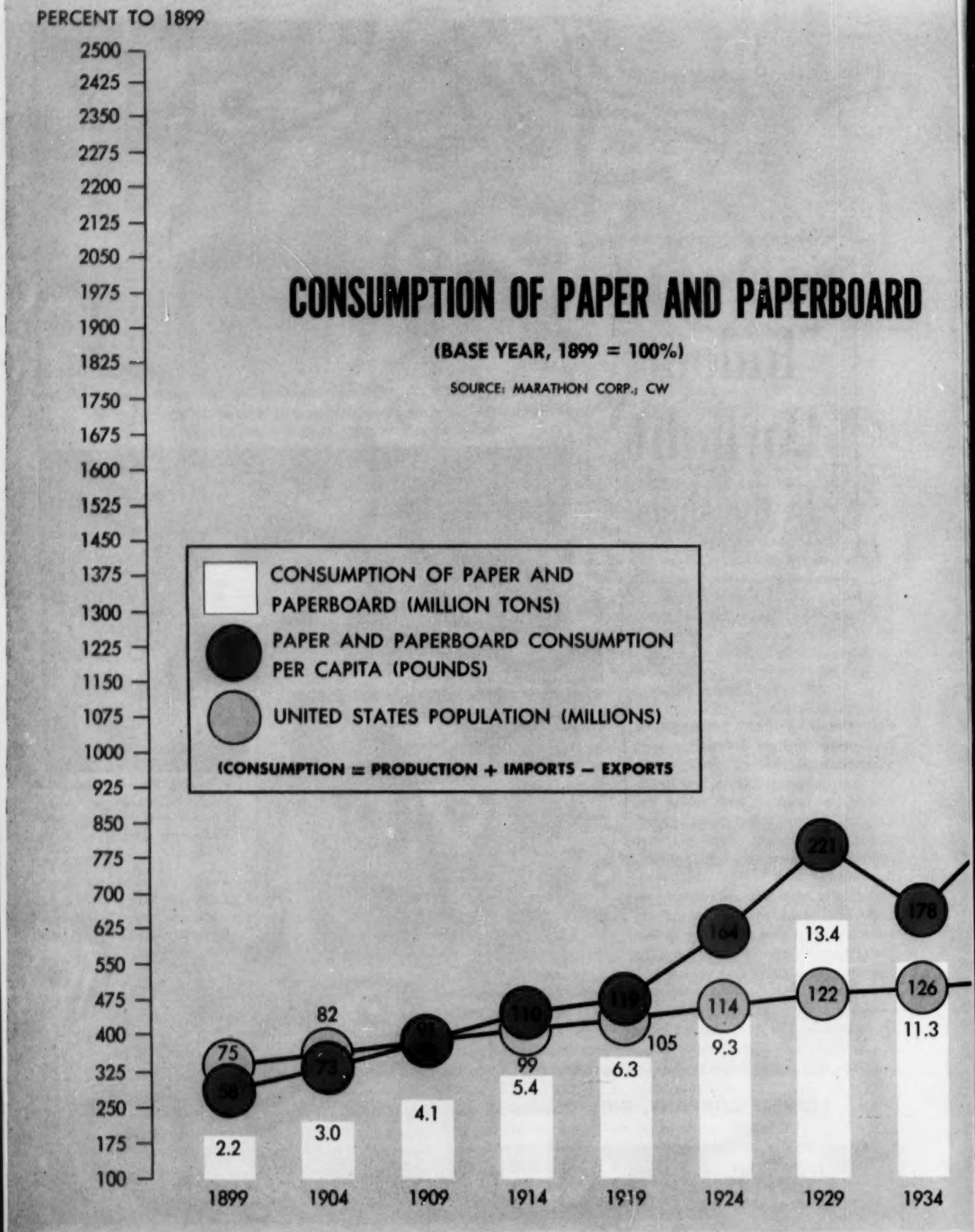
Polyester resin sheets are easy to install—may be drilled or nailed, and are smoothly cut with a saw. They diffuse daylight in all directions, brighten dark corners, and cut the cost of artificial illumination. They are shatterproof, too—won't warp, crack, sag, buckle, rot or mildew. The sheets are available in practically every desirable color.

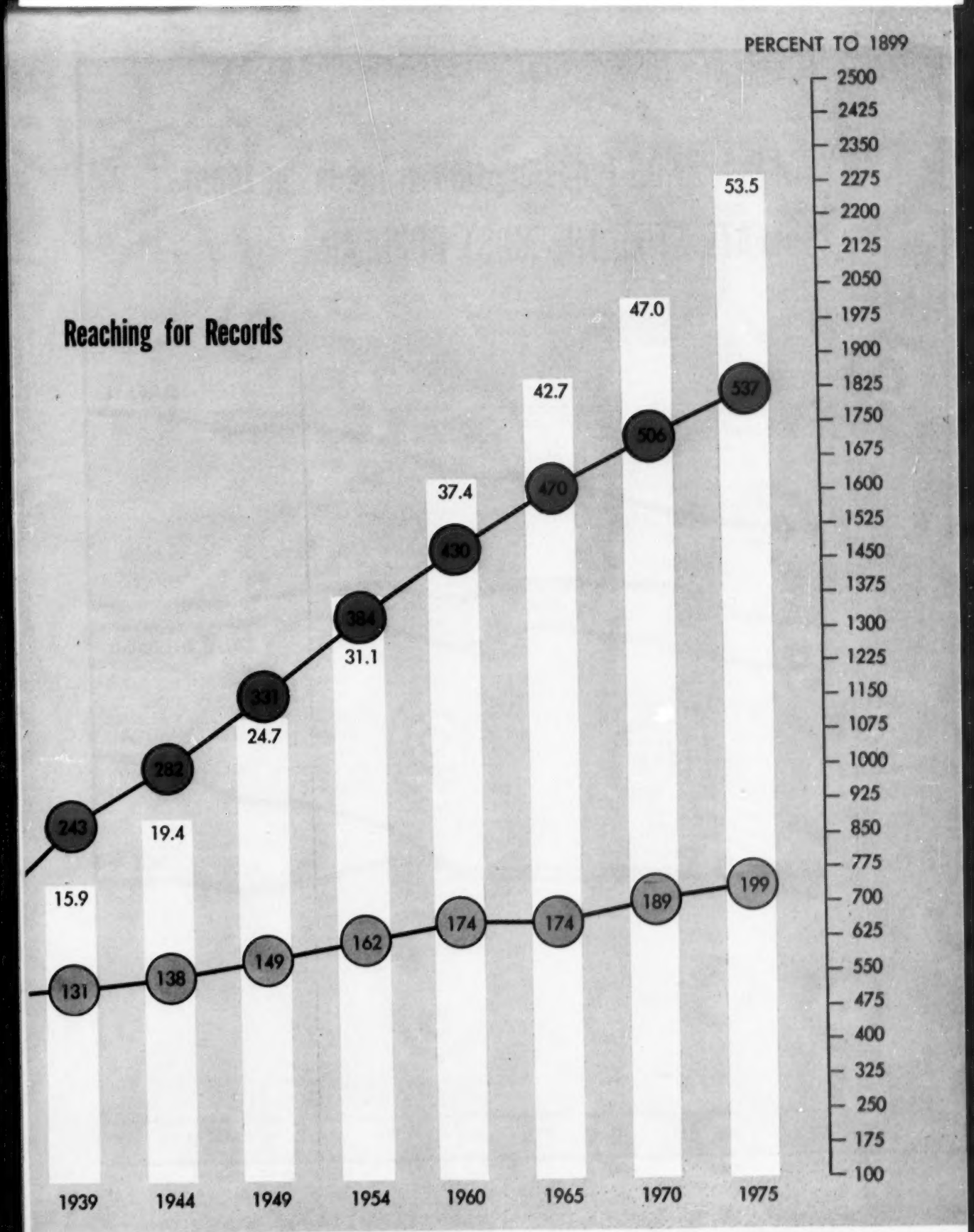
This is only one of the thousands of products made possible through the use of chemicals manufactured by Koppers. Although Koppers does not manufacture polyester panels, we do produce two of the basic ingredients that go into these unique building sheets—Styrene Monomer and Phthalic Anhydride . . . further examples of Koppers contributions that find use in everyday living.

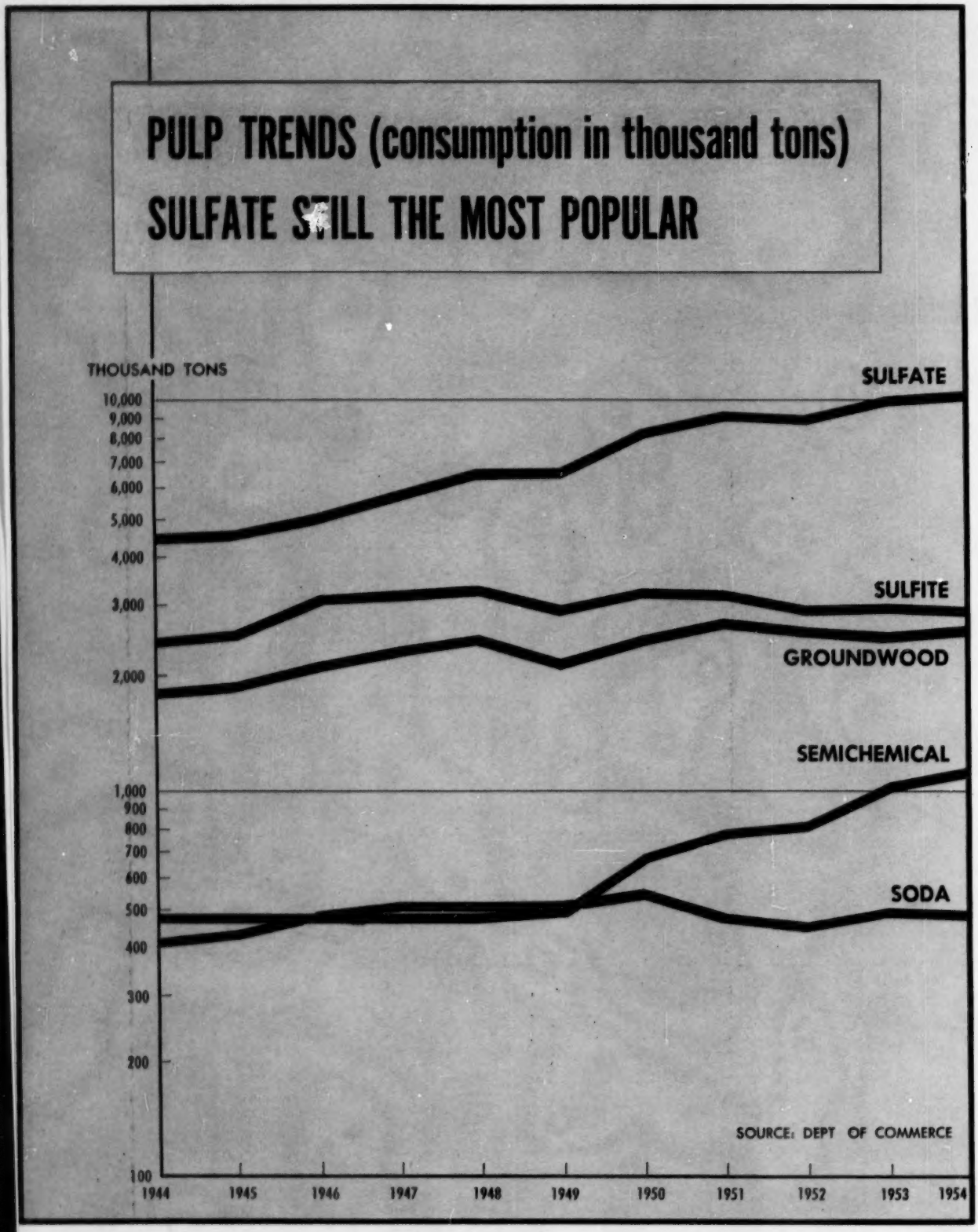
KOPPERS COMPANY, INC., Chemical Division, Dept. CW-95, Pittsburgh 19, Pennsylvania

KOPPERS **Koppers Chemicals**

® SALES OFFICES: NEW YORK · BOSTON · PHILADELPHIA · ATLANTA · CHICAGO · DETROIT · HOUSTON · LOS ANGELES


PERCENT TO 1899
2500
2425
2350
2275
2200
2125
2050
1975
1900
1825
1750
1675
1600
1525
1450
1375
1300
1225
1150
1075
1000
925
850
775
700
625
550
475
400
325
250
175
100
CONSUMPTION OF PAPER AND PAPERBOARD
(BASE YEAR, 1899 = 100%)
SOURCE: MARATHON CORP.; CW
CONSUMPTION OF PAPER AND PAPERBOARD (MILLION TONS)
PAPER AND PAPERBOARD CONSUMPTION PER CAPITA (POUNDS)
UNITED STATES POPULATION (MILLIONS)
(CONSUMPTION = PRODUCTION + IMPORTS – EXPORTS
75
58
82
73
99
105
114
122
126
178
221
2.2
3.0
4.1
5.4
6.3
9.3
13.4
11.3
1899
1904
1909
1914
1919
1924
1929
1934


Reaching for Records
PERCENT TO 1899
2500
2425
2350
2275
2200
2125
2050
1975
1900
1825
1750
1675
1600
1525
1450
1375
1300
1225
1150
1075
1000
925
850
775
700
625
550
475
400
325
250
175
100
15.9
19.4
24.7
31.1
37.4
42.7
47.0
53.5
131
138
149
162
174
174
189
199
243
282
331
384
430
470
506
537
1939
1944
1949
1954
1960
1965
1970
1975


PULP TRENDS (consumption in thousand tons)
SULFATE STILL THE MOST POPULAR
THOUSAND TONS
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
900
800
700
600
500
400
300
200
100
SULFATE
SULFITE
GROUNDWOOD
SEMICHEMICAL
SODA
SOURCE: DEPT OF COMMERCE
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954

C W Report

from kraft pulp waste liquors and is CZ's answer to a worrisome waste-disposal problem.

• West Virginia Pulp & Paper Co. is turning its lignin wastes into salable lignin sulfonates ("Polyfons", used to stabilize fire-fighting foams).

• West Virginia and most other paper companies are beneficiating crude tall oil (once burned as waste) into valuable paint vehicles and rosin size.

• St. Regis Paper Co., taking a slightly different tack, has entered the molded plastics field, has been in the high-pressure laminated-plastics field for 30 years.

• Marathon Corp. has been converting its spent liquor into vanillin as well as into its Marasperse wetting and emulsifying agents.

• Charmin Paper Mills, Inc., more recently started producing the food yeast Torula, using the carbohydrate fraction of spent sulfite liquor as its raw material.*

There are many other similar examples of horizontal expansion, mostly on a smaller scale, and there will be more. With problems—particularly those of waste disposal—forced upon them, paper companies today are spending heavily, looking for inexpensive ways to turn their wastes into salable derivatives. Generally, the return is small even for those who succeed; but at least it will pay for the disposal and often show a small profit where before there was only a total loss.

But the market for such derivatives as yeast and vanillin is limited, and the paper companies could fill them many times over. And numerous other roads to horizontal diversification are already well traveled. So many paper companies have turned to vertical integration both to beef up sinking profit margins and to assure themselves of captive supplies and outlets. St. Joseph Paper Co, for example, has taken to tree farming, has one gigantic farm of 800,000 acres in Florida. Another, Crown Zellerbach, has large stands of trees suitable for pulp stock spread across the Pacific Northwest.

One firm, Brown Co., tried a different vertical approach. In the mid-'20's, Brown bought some Allen-Moore electrolytic cells and seriously turned its hand to chlorine production. It started out on a small scale, just enough to satisfy its own needs. But the firm soon found itself faced with the old processing enigma: What do you do with the concomitant caustic output? Not able to use all of it in its pulp and paper operations, Brown sold the remainder at going rates outside of the industry.

Later, a demand for caustic developed and kept growing, quickly outdistancing Brown's small supply. So Brown upped its caustic-chlorine output to 84 tons/day and just as quickly outdistanced its own chlorine demand. To blot up the surplus, the company tried chlorinated organic compounds for a starter and soon became one of the world's prime chloroform producers. Concentrating on chloroform, Brown found little use for the third component of its electrolytic cell output, hydrogen, which by this time had reached, if not considerable, at least recognizable, proportions.

For a while, the company considered hydrogenation of fats and oils but eventually abandoned the idea. Presently, this hydrogen is going to waste. But Brown is toying with a new idea: generation of chlorine dioxide; this could easily eat up its by-product hydrogen and more.

Paper Bulwark: All this adds up to a fast-climbing industry with total assets of $7.65 billion, total sales of $8.74 billion, and a payroll of $2 billion shared by 531,000 people in 664 different communities. But it is only half the story. The other half is the technical side. And with such notable exceptions as the development of the Fourdrinier machine in 1799 and the many subsequent advances in continuous and automatic operation, it is essentially a chemical story.*

The New Era

To chemicals belongs the credit for what has been called the greatest advance (after the Fourdrinier) in modern papermaking: the development of the soda-pulp process. This enabled pulp men to switch from rags to wood stock, freeing them from the vagaries of a limited raw material supply.** It pushed papermaking out of the backyard into the front ranks of industry.

Twenty years later, the sulfite process moved into commercialization, further widening the way to wood stock utilization and greatly improving the finished pulp. New chemical pulp processes quickly followed, until now all but one of the major pulp processes in use are chemical (*see diagram: Pulp and Papermaking*).***

But the chemical industry got more than credit for its part in the development of the pulp and paper industry; it got a ready-made annuity in the form of a large-economy-size market that's still growing. Presently the second or third largest chemical consumer in the U.S., the paper industry is spending close to $250 million/year for everything from low-volume, high-priced specialties to high-volume, low-priced basic chemicals. If the trend continues at the same clip, in 1980 paper men will be digging into their collective jeans for almost $500 million to pay their chemical bill.

Golden Harvest: Chemicals are basic to the pulp and paper industry. For every ton of paper rolling out of North American mills,† 500 lbs. of chemicals are fed in somewhere along the line. Most of this winds up in the digesters, pulpers and bleachers, but still-sizable quantities find their way into such steps as slime control, sizing, filling, resin removal, foam prevention, dyeing, wetting, and coating—plus the miscellaneous chemicals, such as lubricating oils and water-treatment compounds that are used on the multi-million-dollar paper machines. And, if studies at New York State University College of Forestry prove out, chemi-

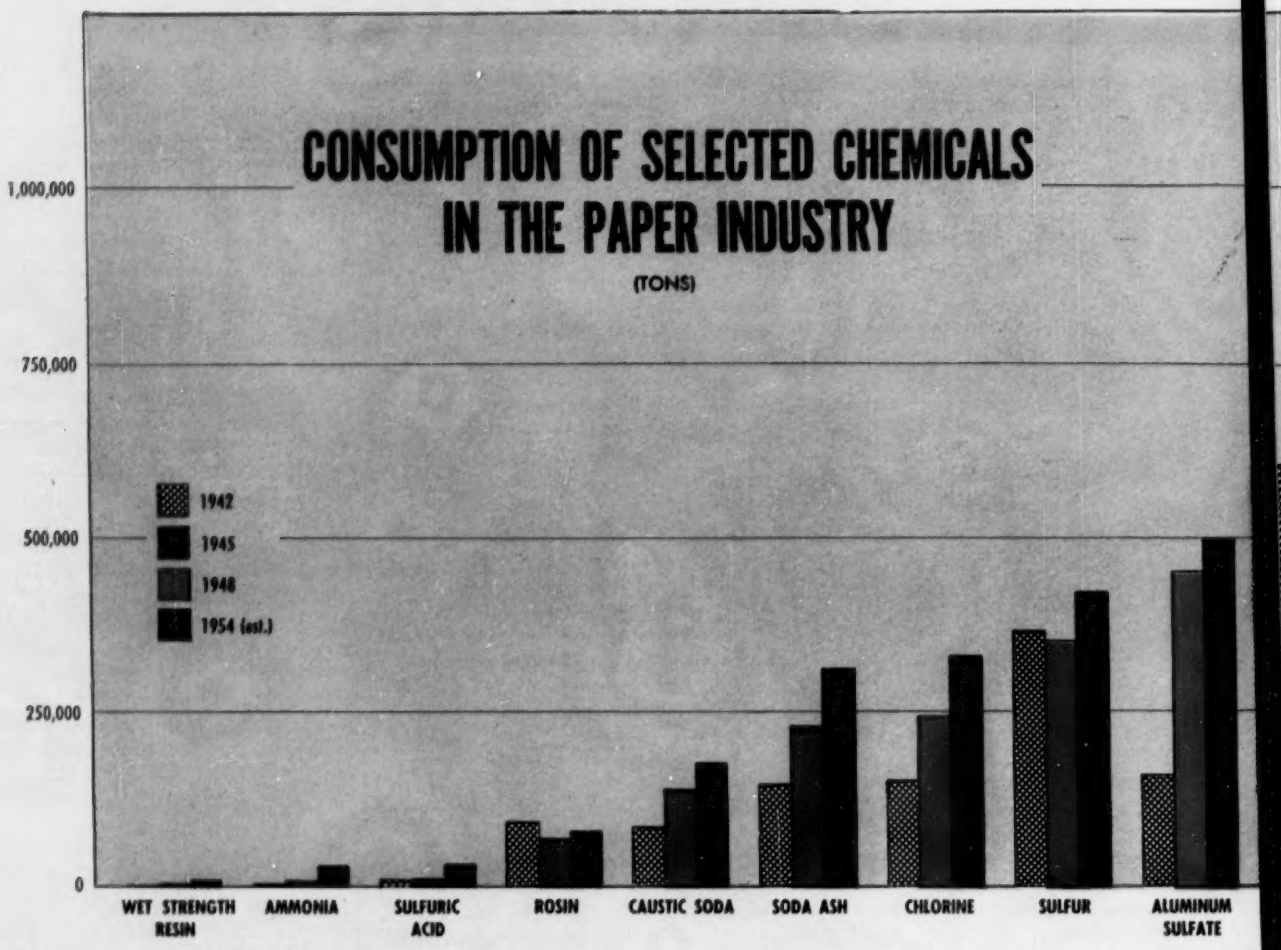
* This development was pioneered by Sulfite Paper Manufacturers Research League.

* A machine for making paper in a continuous sheet, the Fourdrinier was named after the two brothers, Henry and Sealy, who backed inventor Nicholas-Louis Robert with more than £60,000. In its primitive state an endless wire screen that passed between two squeezer rollers, the Fourdrinier changed papermaking from a hand-made batch operation to a smooth-running continuous process.

** Ever since the 1st century, when the Chinese made paper from mulberry bark, men have known how to make paper from wood; but difficulty in extracting the wanted fibers delayed commercialization almost 1,800 years. It was 1851 before partners Hugh Burgess and Charles Watt showed how it could be done "by boiling wood in caustic alkali."

*** The mechanical pulp process. Here the wood is physically ground and pulped; but after leaving the pulp stage it, as in other processes, requires chemicals to turn it into finished paper.

† Except newspaper, 75%-80% of which comes from nonchemical-consuming mechanical pulp.



C W Report

cals will soon be debarking logs as well.

But for the present at least, chemicals don't enter the paper flow lines until after the log has started on its way to the digesters (*see diagram: Pulp and Papermaking*).†† Once in the digesters, of course, the prechipped logs meet their first and heaviest chemical onslaught, lignin is dissolved out, and the fibers are freed for the papermaking stage.

The most significant exception to chemical pulping, of course, is the groundwood process, wherein the wood is ground into pulp by a large, rotating abrasive stone. Developed in 1885 to satisfy the demands of newspaper publishers for the cheapest, high-speed-run material possible, groundwood pulp has ever since been steadily gaining in acceptance. Last year, groundwood consumption amounted to 2.6 million tons, up 44% from a decade before.

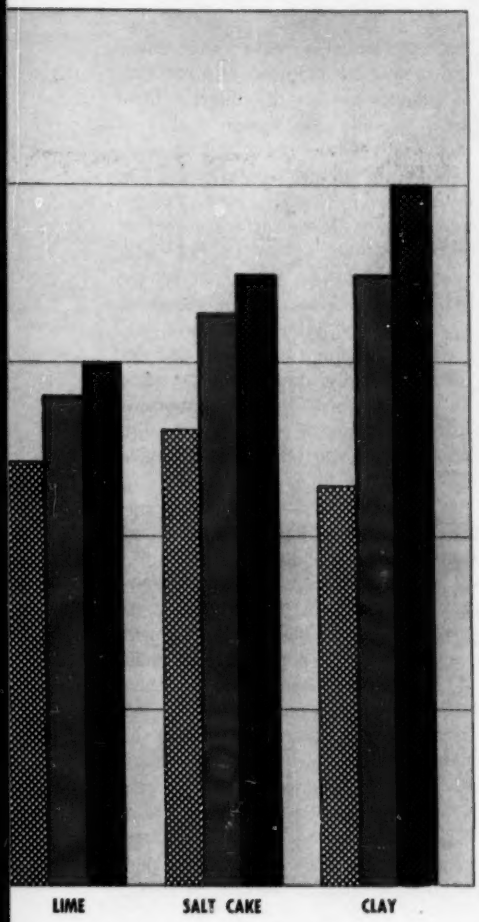
On the other hand, in the same 10-year period, total pulp consumption rose 81%, and groundwood consumption actually dropped from 18% of the total in 1944 to 14% last year. And by 1975, groundwood pulp is expected to run only about 15% of total pulp consumption, or approximately 5.1 million tons. Even at this rate, for chemical men, it is still too big a potential market to be given up gladly.

Salesman's Dream: By far the most attractive pulping operation to chemical men is the kraft (sulfate) process. It is one of the purest and most versatile chemical processes in the industry. It feeds on almost all types of wood, uses 175 lbs. of salt cake for each ton of pulp it turns out. In all, it consumes over 80% of total salt cake produced in the U.S.

Kraft consumption has shot up from less than 1 million tons in the '20s to over 10 million tons in 1954, and shows no signs of abating. By 1975, kraft consumption is expected to approach 16 million tons, or approximately 46% of the total—up over 100% from the '20s.

On the other hand, the soda process, a close relative of the kraft, has shown a decline over the last decade, is not expected to make much of an improvement in the next 20 years. It uses sodium hydroxide as the active cooking agent, and works well on most

†† A rather recent development—and exception—is use of DDT to control spruce bud worm.



woods. But unlike the kraft process, it turns out a pulp of only limited usefulness.

Most soda mills now operating will continue doing business into the foreseeable future, say pulp men, but no expansions are anticipated. The one ray of hope in all this is the cold-soda process, recently developed by U.S. Forest Products Laboratory (Madison, Wis.). In this process, wood chips are impregnated with cold caustic soda and then fiberized in a disk mill. Yields run unusually high (about 90% on a dry wood basis, compared with the more conventional 65%), and the process seems suitable for hardwood pulps, turning out a fiber usable in newsprint. If the process proves out, it will mean a substantial increase in caustic consumption.

Sulfite Switch: Sulfite pulp, too, may have reached the end of its growth period; most of the applications it once cornered can now be as well satisfied by sulfate pulps. Too, the sulfite process is much more limited in its choice of raw materials than is the kraft. This could augur a sharp fall-off in sulfur consumption.

Using as much as 230 lbs. of sulfur (as well as 100-200 lbs. of lime) for every ton of pulp produced, the sulfite mills are today the third largest consumers of elemental sulfur in the nation. The switch from lime to magnesite or ammonia (for reaction with sulfur dioxide to make sulfite liquor, the actual cooking agent) offers the sulfite pulpers a competitive advantage by increasing chemical recovery from waste liquor and thus reducing raw material costs, but it is not expected to materially alter the over-all outlook.

At the same time, this substitution of ammonia for lime in the sulfite mills is taking on the proportions of a trend and is significantly switching the raw material requirements within the pulp and paper industry. The first ammonia-base sulfite operation went onstream only 10 years ago, and today there are 10 such mills in the U.S. and another 5 in Canada. Ammonia consumption in this period has risen from zero to an estimated 40,000 tons/year. And should the price of ammonia drop, pulp men expect to see an even more pronounced changeover.

But the ramifications of this budding trend don't stop here. Rather, they lead directly across the path of another recent development in the industry (*CW, April 2, p. 24*), viz., the growth in construction of captive chlorine units (to assure bleach supply). Most of these chlorine units are electrolytic cells, produce enough by-product hydrogen for each seven tons of chlorine to make one ton of ammonia.

At present, none of these units turns out enough hydrogen to make ammonia production economically attractive. But if they get bigger, papermakers could easily produce additional hydrogen and go into captive ammonia production. Ready availability of outside ammonia contraindicates this for the present, but in five years the picture could change.

One to Go: The one bright spot in the sulfite picture is the advance in favor of the neutral sulfite semichemical process. A comparatively new commercial development, it stands out above all the others in percentage gains, both actual and anticipated. In the short span from 1949 to 1954, consumption has more than doubled —from 502,000 tons 1,121,000—and by 1975 it is expected to increase almost another fivefold to 5,200,000 tons.

The reasons for this remarkable stride are twofold: it is especially suited for processing readily available hardwoods, and it is easily adapted to turning out a wide range of pulps. In regard to the latter, Stanford Research Institute* has this to say about the expected changes in stock base for various types of paper:

- Fine papers: expanded use of semichemical pulps, displacing some white pulp, notably bleached sulfite and soda pulps.
- Newsprint: development of the use of semichemical pulps, substituting in part for the white pulps (unbleached sulfite) and in part for the groundwood.
- Book and printing papers: increasing use of both semichemical and groundwood pulps, with both replacing some of the white pulp.
- Coarse papers: limited use of semichemical pulp.
- Sanitary, tissue, and other papers: no significant change.
- Paperboard: expansion of semichemical pulp use, replacing mainly wastepaper, straw, and other nonwood materials, but with a limited displacement of sulfate.

First patented in 1880, semichemical pulping saw little application until the U.S. Forest Products Laboratory took it over in 1920. Work at FPL culminated in a revision in the process and in a new patent issued in 1926.

Basically, semichemical pulping consists of a mild treatment of wood chips with sodium sulfite (plus some alkali buffer). The cooking solution is usually prepared by burning sulfur to sulfur dioxide, converting this into sulfurous acid, and reacting the acid with sodium carbonate to form a sodium bicarbonate-buffered solution of sodium sulfite. On the average, production of one ton of air-dry semichemical pulp consumes 59 lbs. of sulfur and 262 lbs. of soda ash. This could help hitch up the slack from a fall-off in sulfite output.

Still greater use of sodium sulfite could result from expansion of chemi-

* In its 1954 report on "America's Demand For Wood," sponsored by Weyerhaeuser Timber Co.

C W Report

groundwood pulping. Also especially suited for operation with hardwoods, this process impregnates bolts with sodium sulfite solution, then grinds the (hard)wood into fibers particularly well-suited for newsprint. For every ton of air-dry pulp turned out, the process uses about 55 lbs. of sulfur plus 250 lbs. of soda ash. In large measure, the future of chemigroundwood pulping hinges on the outcome of operations at Great Northern Paper Co.'s new mill in Millinocket, Me.

Rags and Whatnot: Of all the other pulping operations, practically none is expected to change its current course significantly over the next 20 years. Here is a rundown on some of the more interesting ones:

• Rags, once the prime raw material for papermaking, have, of course, declined greatly in importance. They still serve as stock for special high-grade paper, and as such offer a steady if small market for lime and caustic digesting agents.

• Wastepaper, rising slowly over the past few years and then dropping off last year, currently accounts for paper and paperboard products roughly equivalent to about 8 million tons/year of pulp. The fibers in wastepaper are usually recovered by mechanical beating and shredding. Sometimes, to achieve greater uniformity in the recovered fibers, they are later cooked with soda ash. At best, this offers chemicals a comparatively small market, and no foreseeable upswing is evident.

• Nonwoods, principally straw and bagasse, blended with conventional pulps, have proved serviceable as newsprint. But with the exception of one-shot service in 1949 to help stem the inflationary trend of wood pulp prices, they have found only limited acceptance in the U.S.* In other countries short on wood, many efforts are being made to use these materials. Most of the work so far centers on the use of caustic cooking agents, except for the Pomilio process (developed in Italy and now in use in several South American plants), which uses considerable chlorine in addition to caustic to digest the nonwood materials.

• Nitric pulping, the new Delbay process (*CW, Jan. 22, p. 34*), is claimed to be capable of pulping any cellulosic material continuously and at lower costs than conventional operation. Use of nitric acid pulping, of course, isn't new, and has a lot of drawbacks. American pulp men are waiting to see what happens at the new Delbay plant in northern France.

• Asplund process, a relatively new pulping procedure, is characterized as a thermo-mechanical separation of fibers in one continuous operation.† The resultant pulp is said to be suitable for use in insulating and hardboards, roofing and flooring felt, bulk fiber and certain paper products.

The Blue Chips: Once the actual pulping is done with, the course of chemical processing in the pulp and paper industry smooths out considerably. Many pulps and recovered fibers, regardless of source, are used directly in papermaking; some pulps are further processesd by bleaching, thus creating the second gigantic market for chemicals in the paper industry, mostly for chlorine. It is, in fact, the biggest market for chlorine there is. In actual consumption, last year the industry devoured 330,000 tons.

But if the surface has smoothed out, there are still some very definite tremors beneath the surface. Long the only bleaching agents in the field, chlorine, caustic and lime have proved less than satisfactory in the bleaching of groundwood pulp. In the early '40s, peroxide bleaching took hold and developed rapidly. Hydrogen peroxide and sodium peroxide proved superior in the bleaching of groundwood pulp. Now they are starting to make inroads into kraft bleaching.

Even more recent is the development of chlorine dioxide bleaching of sulfite and kraft pulps. Growing rapidly, it is in effect displacing some hypochlorite bleach. In balance, the total consumption of chlorine dioxide will probably continue comparatively small and is unlikely to significantly alter the over-all chlorine market.

At the same time, the growth in chlorine dioxide bleaching has noticeably changed one aspect of paper's chemical consumption pattern—the use of sulfuric acid, together with sodium chlorate and a reducing agent, the raw material for chlorine dioxide. In 1940,

* For many years, straw has been used to make boxboard, though currently replaced to a large extent by semichemical pulp and kraft.

† Most chemical pulps are made by batch process today.

PER CAPITA PAPER CONSUMPTION
(pounds)

	1950	1954
United States	382.5	383.6
Canada	260.4	280.3
Sweden	141.5	194.0
United Kingdom	133.3	162.7
Denmark	122.4	136.9
Netherlands	108.4	131.4
Norway	112.0	139.6
Switzerland	103.6	140.4
West Germany	73.4	114.4
France	63.2	82.5
Czechoslovakia	38.4	.....
Poland	25.1	.....
Russia	13.6	.....
China	1.9	.....

Source: Organization for European Economic Cooperation, Pulp & Paper Statistics 1954.

For the new look in:

Paper–glossier wraps for greater sales appeal, improved seal and scuff. The package competes with costlier see-thru wraps in appearance.

Waxes–fortified and up-graded for year 'round processing advantages in your plant.

Printing Ink–greater slip resistance and improved scuff, sharper color contrast.

Rubber–an excellent modifier and lubricant for natural and synthetic elastomers. Replaces costly vegetable and natural waxes.

Paper Box Board–improves coatings and other functional properties.

Cork Tile–gets a new high gloss, scuff-resistant finish.

Asbestos Siding–protection from handling and for improved weathering.

New Look and improved qualities for waxes, printing inks, paper, paper box board, rubber, asbestos siding, and many other products are being obtained by the addition of low-molecular-weight, low-viscosity A-C POLYETHYLENE. The low cost of A-C POLYETHYLENE, its ease of handling and the profitable improvements it contributes, should prompt you to evaluate this versatile material in your plant without delay.

Write on your letterhead today for additional data and samples indicating your intended use. A-C POLYETHYLENE is available in regular or emulsifiable form.

Add → A-C* Polyethylene

SEMET-SOLVAY PETROCHEMICAL DIVISION
Allied Chemical & Dye Corporation
Room 520
40 RECTOR STREET, NEW YORK 6, N. Y.
New York • Cleveland • Chicago

Allied Chemical

*trade-mark

C W Report

the use of sulfuric acid was limited mostly to specialty papers and amounted to only 9,000 or 10,000 tons. Since then, it has risen to over 30,000 tons/year.

Among the other applications for chemicals in papermaking, aggregate markets continue strong, show few significant changes. This is how they stack up:

• Filling: Clay still holds down top spot tonnagewise, followed closely by calcium carbonates and talc. Use of titanium dioxide pigments has moved up rapidly but poses little threat to the leaders. Once weaned from their preference for English material, paper men soon became the best customers the domestic clay industry ever had. Last year, they bought 500,000 tons for use as filler and somewhat more for use in coating paper.

• Sizing: Starch (principally corn, tapioca and potato) is still one of the most popular sizing materials in the paper industry. On the other hand, rosin has become the most widely used size where water resistance is important. Over the past 15 years, rosin size has increased 20 to 30%, last year amounted to 80,000 tons—approximating the growth rate of paper itself, and shows no significant change in over-all sizing balance.

A more noteworthy trend in this direction is the rapid expansion in the use of wet-strength resins. In 1940, total consumption of these resins was approximately 50 tons. By 1948, it had jumped to 3,500 tons and this year is expected to reach 9,000 tons. While growth in consumption is expected to continue, substitution of the more efficient melamine-formaldehyde for the more popular urea-formaldehyde resins—resulting in a smaller use of resin for the same amount of paper—is expected to level off the curve.

• Dyeing: Last year, the U.S. paper industry spent over $20 million for dyes, consumed about 5,000 tons of color pigments. Out of the hundreds of available dyes, there are only 50-60 important dyes and pigments used extensively and repeatedly, with few significant changes from year to year. One such change, recently, has been the growing use of colorless fluorescent dyes for optical brightening of paper. With some such internal changes, growth in total dye consumption is expected to match stride with over-all paper usage—little more.

• Coating: Developments in this field have been fast and many; most of them are significant. Witness the resurgence of interest in wax paper by both the producer and packager; the rapid growth in marketing of reproduction papers; the many new developments in adhesive papers. But for sheer potential, coating of paper with plastic films perhaps stands out.

• Resin and pitch removal, wetting, slime control, and foam prevention: Innovations in these fields have yet to take on the appearance of a trend; most are in a state of experimental flux. Markets in these areas, though comparatively small, are available for such higher-priced specialties as silicones and organomercurials.

TOP 10
North American Paper Companies

	Number of Mills	Capacity (tons/day, paper or board)
International Paper Co.	17	10,293
Crown Zellerbach Corp.	9	3,600
West Virginia Pulp & Paper Co. (Hinde & Dauch Paper Co.)	11	3,094
St. Regis Paper Co.	12	2,938**
Mead Corp.*	12	2,900
Consolidated Paper Corp., Ltd.	5	2,736
Robert Gair Co. (Gair Co. Canada, Ltd.)	14	2,710
Container Corp. of America	13	2,609
Abitibi Paper & Power Co., Ltd.	6	2,393
Scott Paper Co. and subsidiaries	10	2,135

* One mill under construction and one mill (90 tons/day) idle are not included.

** New 1,000-ton capacity under construction is not included.

Problems and Prophecies

Never before in its history has the pulp and paper industry resounded with so much optimism. And, more significantly, the industry is putting its money behind it. A fast look at future plans shows expansion everywhere, and along with the expansion, continuing emphasis on modernization and research.

In large measure, survival itself swings on the industry's ability to streamline operations and cut costs. The independents realized this a long time ago. Now the leaders are getting into step, taking a sharp second look at everything from the basic log skids to their by-product recovery units.

The Big Ones: Today, paper men are making advances all along the line, meeting, in most instances successfully, one challenge after the other. Met but still not subdued are two chief challenges:

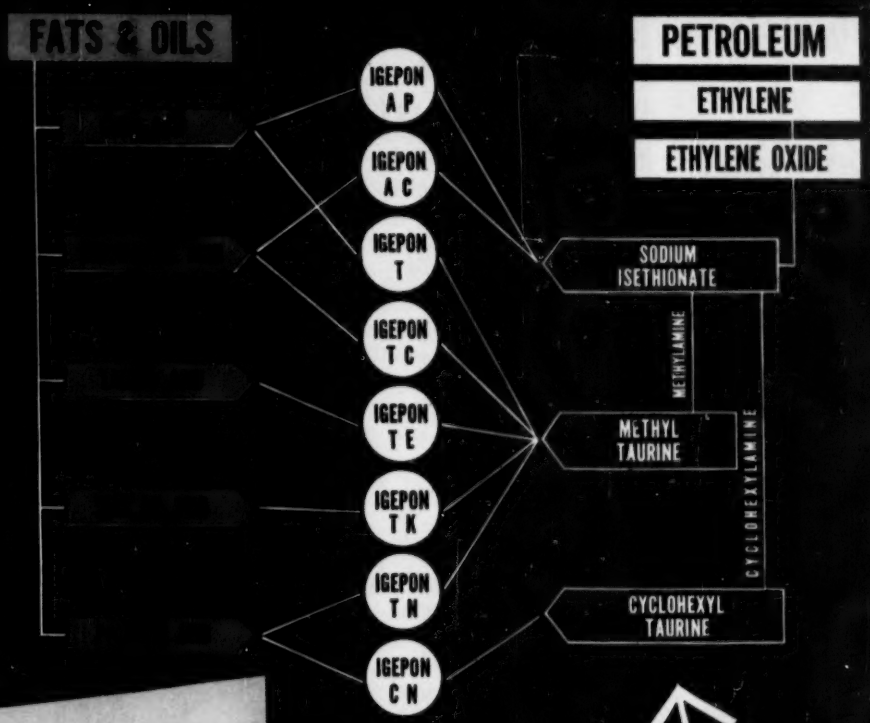
• More nearly complete wood utilization.

• More nearly theoretical pulp yields.

Seldom dull-eyed when it came to mechanical improvements, paper men for a long time overlooked the vast potential locked in the tree itself. Even today, less than 50%* of the tree ever finds it way to market.

Of special interest to paper men, of course, is the derivation of salable products from the unending flow of its

* Groundwood and semichemical pulping offer somewhat higher over-all yields.



No other surfactants equal the performance and versatility of Igepons

Chemical Derivation of Igepon

There are 8 basic Igepons, each supplied in various concentrations and physical forms, and there is one to do the job for you.

Igepons are important in many industries, including cosmetics, textiles, detergents, paper, leather, agricultural and industrial chemicals, to improve a product or process. In some cases, an Igepon is selected because of its high or low foaming characteristics, its unique dispersing or emulsifying qualities, or for its excellent detergency; in others, an Igepon is selected for its wetting power, chemical stability or physical properties.

So whether you're looking for a surfactant in an agricultural wettable powder, a base for laundering detergents, or a bubble bath formulation, check with us on the correct Igepon to use in your particular application.

Write us today for information and samples of these unique, versatile surfactants.

ANTARA gaf

ANTARA CHEMICALS

A SALES DIVISION OF GENERAL ANILINE & FILM CORPORATION

435 HUDSON STREET • NEW YORK 14, NEW YORK

Atlanta • Boston • Charlotte • Philadelphia • Charleston • Chattanooga • Chicago
Cleveland • Los Angeles • San Francisco • In Canada: Chemical Developments of Canada Ltd., Montreal

want help...

in developing tomorrow's markets?

Consult Evans Research

if you have a research or development problem — long or short range...

... that is being held up by personnel, equipment, or space shortages.
... that you would like to get underway immediately—without expanding your own facilities.
... that requires a fresh, impartial viewpoint.
... that you would like to turn over to an outside research organization—either to take sole responsibility or to supplement your own staff.... Write us today. Literature available.

Research—Catalyst for Industry

EVANS RESEARCH
and Development Corporation, Dept. W 1
250 East 43rd St. New York 17, N.Y.

CW Report

spent cooking liquors, thereby increasing over-all tree utilization while diminishing the problem of waste.

Particularly pressing is the problem created by spent sulfite liquor, which contains both lignin and residual carbohydrates. The lignin, made soluble by combination with sulfonic acid groups, is extremely difficult to separate out, and if discharged into a stream acts as a pollutant doubly compounded by the residual carbohydrates, which rob aquatic life of vital oxygen.

This problem continues to be the focus of ever-expanding research efforts, particularly in the development of salable lignin derivatives. The most promising new approach: fractionation and utilization of the components rather than the spent liquor *in toto*.

As for improvements of pulp yields, continuing efforts have resulted only in upgrading past yields 5-10%, depending on end uses. But far from giving up, paper men expect to press this problem even harder in the future, have already attained yields of over 85% for chemical pulps.

On a Limb: Somewhat akin to this problem of total utilization has been the search for additional wood species suitable for pulping. Shortly after paper men found out they could use wood instead of rags and straw to make pulp, they started moving their mills to the forests. Thus committed, 100 years later they were faced with abandonment of their mills when the large stands thinned out and the pines, spruces, firs and poplars they had depended on were no longer available in sufficient quantity.

The alternative was use of the untried hardwood, heretofore considered unusable, that now surrounded their mills. The paper men took the alternative, and this in turn led to a search for new processes suitable for hardwoods, But the search both for new woods and for new processes to pulp these woods continues apace.

There are many other studies and developments now aboil in the industry that could show up as the core of future trends. A few have already caused noticeable ripples. Here is a rundown on some of the more significant ones:

- An active program of reforestation by the industry is insuring a continued source of wood supply.
- Growing demand by self-service outlets for individually packaged items —ranging from hardware to men's hose—will noticeably boost consumption of bleached sulfate pulp.
- Brighter bleaching of groundwood by the peroxides has already resulted in increased use of this pulp for magazine papers.
- Chlorine dioxide's ability to bleach initially dark pulps to high whiteness is opening up new fields for kraft pulp.
- Better utilization of fibers' tensile strength could result in lighter papers and subsequent savings in raw material.*
- Colloid studies are expected to improve peptization, dispersion, prevention of agglomeration and deflocculation. Phosphates and tanning agents look promising as aids in pigment dispersion, clay slip dispersion, and pitch control.
- Use of natural and synthetic rubbers has already pointed the way to stronger, tougher, and more-resistant papers for certain uses.

These are but a few of the embryo projects now developing in the pulp and paper industry. Many of them will die out, of course, but a few, like other improvements before them, will grow into big realities.

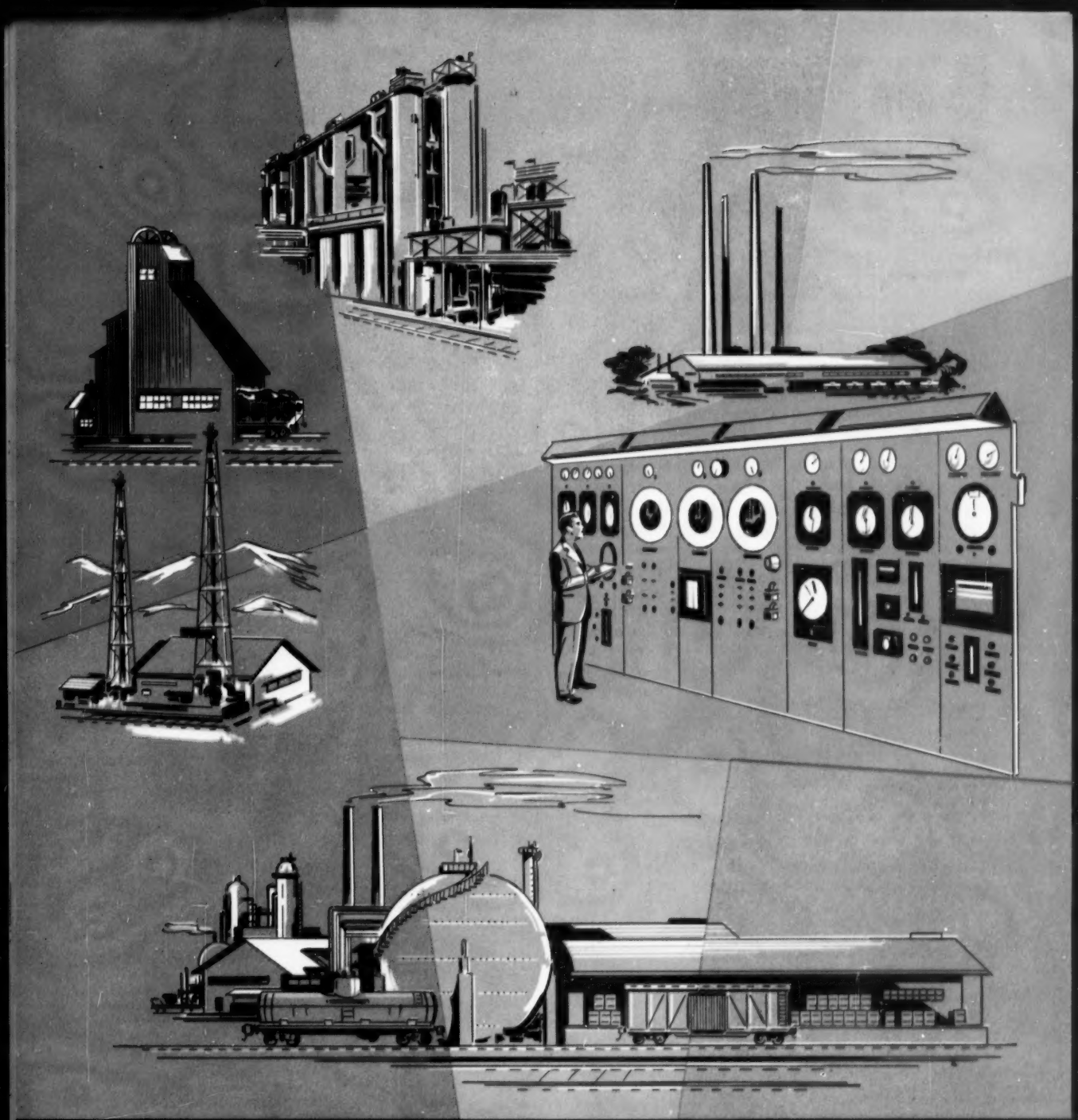
Perfect papermaking is a long, endless step away. "Most likely, we'll never get there," says one of the leading mill owners, "but we'll sell a lot of paper along the way."

* Tensile strength of a single cellulose fiber approximates that of a comparable strand of steel. Made into a sheet of paper, the fiber achieves only 10% of its ultimate strength because of weak fiber-to-fiber bonding.

Reprints Available

Copies of this report are available from Chemical Week, Reprint Dept.,, 330 W. 42nd St., New York 36, N. Y., at 50¢ each.

Prices for bulk quantities (over five copies) and for previous CW Reports are available upon request.



A dependable source for solvents, organic acids, fatty alcohols, and other basic chemicals . . .

the **POLYCHEMICALS DEPARTMENT** of

DU PONT

ADIPIC ACID

$(CH_2)_4(COOH)_2$ — *White crystals*

Adipic acid is an organic dibasic acid with the chemical properties characteristic of this group of compounds. It is soluble in alcohol; slightly soluble in water.

Adipic acid is used in the manufacture of adipic acid esters. These esters are excellent plasticizers, especially for vinyl resins, to which they impart good low-temperature properties. Other uses of adipic acid include the manufacture of modified alkyd resins and polyurethane foams and rubbers.

Shipped in 50-lb. multi-ply paper bags from strategically-located stock points.

"ARBONEELD"* A

dimethylolurea — *Coarse-ground solid*

"Arboneeld" A is a urea-formaldehyde composition with a urea-formaldehyde mol ratio of 1:2, and a minimum urea-formaldehyde content of 87% by weight. It is water-soluble up to 24.2% by weight at 20°C.

"Arboneeld" A is used in the impregnation of wood to increase hardness, density and dimensional stability; as an insolubilizer for starch in clay-coated papers; and in certain specialty applications common to urea-formaldehyde resins.

Shipped in 100-lb. paper bags.

CRYSTAL UREA

(carbamide) $(NH_2)_2CO$ — *White crystals*

Crystal urea is one of the most versatile of all basic chemicals. Because of its reactivity with aldehydes, it finds one of its major uses—urea-formaldehyde thermosetting resins for adhesives, protective finishes, molding powders and for treating paper and textiles.

Because it neutralizes acids, crystal urea is used in ammoniated dentifrices and as a stabilizer. Crystal urea decomposes at temperatures over 133°C. to release carbon dioxide and ammonia gases, permitting its use in the manufacture of many foamed products.

Crystal urea is used extensively for softening paper and cellulose; its hygroscopic properties are particularly helpful in this application. And because crystal urea has the ability to increase the solubility of certain compounds in water, it is used in paper adhesives and in starch coatings.

Other applications of crystal urea include its use in the synthesis of dyes and pharmaceuticals; in fire-resistant paints; and with starch and other materials for weighting, sizing, and finishing textiles.

Shipped in 100-lb. multi-ply paper bags from strategically-located stock points.

DIGLYCOLIC ACID

$O(CH_2COOH)_2$ — *White crystals*

Diglycolic acid is a dibasic acid, completely soluble in water and the lower alcohols. Its major use is in the manufacture of resins and plasticizers.

Chemically, diglycolic acid reacts with alkalies to form acid and neutral salts and with alcohols to form esters. It reacts with ammonia—under proper dehydrating conditions—to form either the amide or the six-membered cyclic imide.

Shipped in 50-lb. multi-ply paper bags.

DIMETHYL SULFATE

$(CH_3)_2SO_4$ — *Water-white liquid*

Dimethyl sulfate is a highly reactive compound and is an important methylating agent in organic synthesis. It is reactive at low temperatures; its high boiling point (188.8°C.) permits its use at atmospheric pressure; it is economical.

Dimethyl sulfate is soluble in alcohol, ether and benzene. It is used in the manufacture of a number of synthetic drugs and in certain dye intermediates.

Shipped in tank cars and special 10-gallon and 55-gallon returnable steel drums.

FORMAMIDE

(technical) $HCONH_2$ — *Water-white liquid*

Formamide is an exceptionally good solvent for inorganic salts, casein, gelatin, animal glue, starch, lignin, glucose, and zein. It is completely miscible with water, methanol, and ethanol.

Applications for formamide, other than as a solvent, include its use as a softener (e.g., in paper, glues); as an intermediate in the manufacture of pharmaceuticals; and in the manufacture of formic acid.

Shipped in tank cars and 55-gallon non-returnable steel drums.

"HEXALIN"*

cyclohexanol $C_6H_{11}OH$ — *Water-white liquid*

"Hexalin" cyclohexanol is a particularly good solvent for gums, resins, and waxes. It is miscible with alcohol, aromatic hydrocarbons and most other common organic solvents. It is soluble in water up to 3.6% by weight (at 20°C.) and dissolves water up to 11%.

"Hexalin" is especially useful in the manufacture of ester plasticizers. It is also used as a solvent in lacquers, shellacs and varnishes; as a non-corrosive degreasing agent for metals; as a diluent thinner of fuel oil additives; and as a stabilizer in textile soaps.

Shipped in tank cars and 55-gallon non-returnable steel drums.

HYDROXYACETIC ACID

(glycolic acid, tech. grade, 70%) $HOCH_2COOH$ — *Straw-colored liquid*

Hydroxyacetic acid is a relatively strong organic acid, having properties common to this class of compounds. It is miscible in all proportions with water and water-soluble organic solvents such as methanol, ethanol, acetic acid and acetone. It is easier to handle than the mineral acids and more economical than other organic acids.

Hydroxyacetic acid is used in acid detergents for the cleaning of dairy and similar equipment. Other applications include its use in electropolishing and electroplating solutions, in the acid dyeing of wool as well as in the dyeing and tanning of leather.

Shipped in tank cars and 50-gallon wooden barrels.

"HYTROL"* O

cyclohexanone $C_6H_{10}O$ — *Water-white liquid*

"Hytrol" O cyclohexanone is an especially outstanding solvent for nitrocellulose and for polyvinyl chloride and its copolymers. It dissolves a number of plastics and resins and is miscible with ether, alcohol, and most other organic solvents. Nine grams of "Hytrol" O will dissolve in 100 cc. of water at 30°C.

"Hytrol" O is used in many types of finishes, especially those based on vinyl resins. It is also used as the active ingredient in vinyl dispersions, as a solvent for DDT in insecticides.

Shipped in tank cars and 55-gallon steel drums.

"LOROL"*

fatty alcohols $CH_3(CH_2)_nCH_2OH$

"Lorol" fatty alcohols are a group of straight-chain (normal) even-numbered-carbon alcohols ranging from C-8 (octanol) to C-18 (stearyl).

"Lorol" fatty alcohols can be esterified with acids to form the corresponding esters. They can be oxidized to the corresponding aldehyde, which can be oxidized further to the corresponding acid.

"Lorol" fatty alcohols are readily sulfated to form excellent detergents. They are also used as emulsifying and softening agents in cosmetics, salves and ointments; in the manufacture of plasticizers; in the manufacture of lubricating oil additives; and as anti-foam agents in the paper and textile industries. "Lorol" fatty alcohols are available in the compositions shown below.

"Lorol" 5 and "Lorol" 7

Viscous water-white liquids

. . . technical lauryl alcohols . . . are available in two grades of mixtures made up principally of lauryl and myristyl alcohols. Both "Lorol" 5 and "Lorol" 7 are insoluble in water and both are completely miscible above 30°C. with methanol, 95% ethanol, ethyl ether and benzene.

Shipped in tank cars and 55-gallon drums.

"Lorol" 20

Viscous water-white liquid

. . . essentially normal octanol, $CH_3(CH_2)_6CH_2OH$. "Lorol" 20 is only very slightly soluble in water (0.059 g. octanol per 100 g. water at 25°C.); completely miscible at room temperature with methanol, ethanol and ethyl ether.

Shipped in tank cars and 55-gallon drums.

"Lorol" 22

Viscous water-white liquid

. . . essentially normal decanol, $CH_3(CH_2)_8CH_2OH$ . . . is insoluble in water; completely miscible at room temperature with methanol, 95% ethanol, ethyl ether, benzene, cyclohexane, carbon tetrachloride, ethyl acetate, and acetone.

Shipped in tank cars and 55-gallon drums.

"Lorol" 24

$CH_3(CH_2)_{14}CH_2OH$ — *White, waxy flakes*

"Lorol" 24 . . . a normal cetyl alcohol . . . is available in a National Formulary grade. "Lorol" 24 is insoluble in water; soluble in methanol, 95% ethanol, ethyl ether, and benzene.

Shipped in 125-lb. fiber drums.

"Lorol" 28

$CH_3(CH_2)_{16}CH_2OH$ — *White, waxy flakes*

"Lorol" 28 . . . a normal stearyl alcohol . . . is available in two grades—a technical grade for industrial purposes, and a U.S.P. grade. "Lorol" 28 is insoluble in water; slightly soluble in methanol, 95% ethanol, ethyl ether, and benzene.

Shipped in 50-lb. paper bags (Industrial grade) and 50-lb. fiber drums (U.S.P. grade).

METHANOL

CH_3OH — *Water-white liquid*

Methanol is one of the most versatile and reactive of all alcohols. Among its many important chemical reactions are its oxidation to formaldehyde and its reactions with organic and inorganic acids to form their methyl esters. It can be decomposed to provide a source of hydrogen and carbon monoxide. It is a solvent for many common resins.

Methanol is completely miscible with water, alcohols, organic esters, ketones, chlorinated hydrocarbons, and petroleum ether.

Major uses of methanol include the manufacture of formaldehyde and many methyl esters; constituent of mixed solvents for many purposes, including finishes; solvent for the extraction of mercaptans from gasoline; solvent for the extraction of animal and vegetable oils; solvent in the manufacture of pharmaceuticals; ingredient of automotive and other anti-freezes.

Shipped from strategically-located stock points in tank cars, tank transports, tank wagons and 55-gallon drums.

METHYL FORMATE

(technical, 97%) $HCOOCH_3$ — *Water-white liquid*

Methyl formate is a low-boiling solvent with a pleasant odor. It is solubie in water up to 30% by weight (at 20°C.), and is miscible with practically all organic solvents. It is a good solvent for cellulose ethers and esters, acrylic resins, and polyvinyl acetate. It is readily hydrolyzed to methanol and formic acid.

Other than its use as a solvent, methyl formate finds application in the manufacture of formates and other organic chemicals, including sulfa drugs. As an ingredient in fumigants, it is harmless and leaves no residual odor or taste.

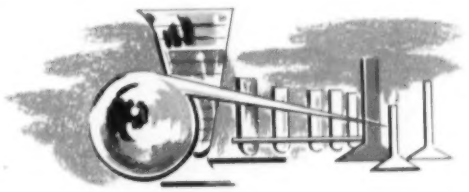
Shipped in tank cars and 10- and 55-gallon drums.

PROPIONIC ACID

CH_3CH_2COOH — *Water-white liquid*

Propionic acid is an organic acid, soluble in water, alcohol, and most organic solvents. It is used in the manufacture of cellulose propionate and mixed esters, in the manufacture of plasticizers for cellulosic esters, in the manufacture of ester solvents, and in fruit flavors and perfume bases.

Shipped in tank cars and 55-gallon drums.



Other products of the Polychemicals Department include:

Tynex* nylon filament, Pyralin* cellulose nitrate sheeting, Plastacele* cellulose acetate sheeting, Butacite* polyvinyl butyral resin, Mycoban* sodium and calcium propionates, Zerone* and Zerex* anti-freezes, urea fertilizer and feed compounds, as well as a distinguished family of plastic engineering materials—Zytel* nylon resin, Lucite* acrylic resin, Alathon* polyethylene resin, and Teflon* tetrafluoroethylene resin.

*Reg. U. S. Pat. Off.

For more information about any of these products, mail this coupon.

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept., Rm. 571
Wilmington, Delaware

( ) Please send me complete information on the following products:

.....

.....

( ) I am interested in the following uses:

.....

.....

( ) Please send me ..... (no.) copies of above product listing for reference.

Name ..... Title .....

Firm .....

Address .....

City ..... State .....

DISTRICT OFFICES

140 Federal Street
Boston 10, Massachusetts

350 Fifth Avenue
New York 1, New York

1616 Walnut Street
Philadelphia 3, Pennsylvania

13000 W. Seven Mile Road
Detroit 35, Michigan

7250 N. Cicero Ave., Lincolnwood
Chicago 30, Illinois

818 Olive Street
St. Louis 1, Missouri

613 Midland Savings Bldg.
Denver 2, Colorado

111 Sutter Street
San Francisco 4, California

2930 E. 44th Street
Los Angeles 58, California

DU PONT
REG. U. S. PAT. OFF.

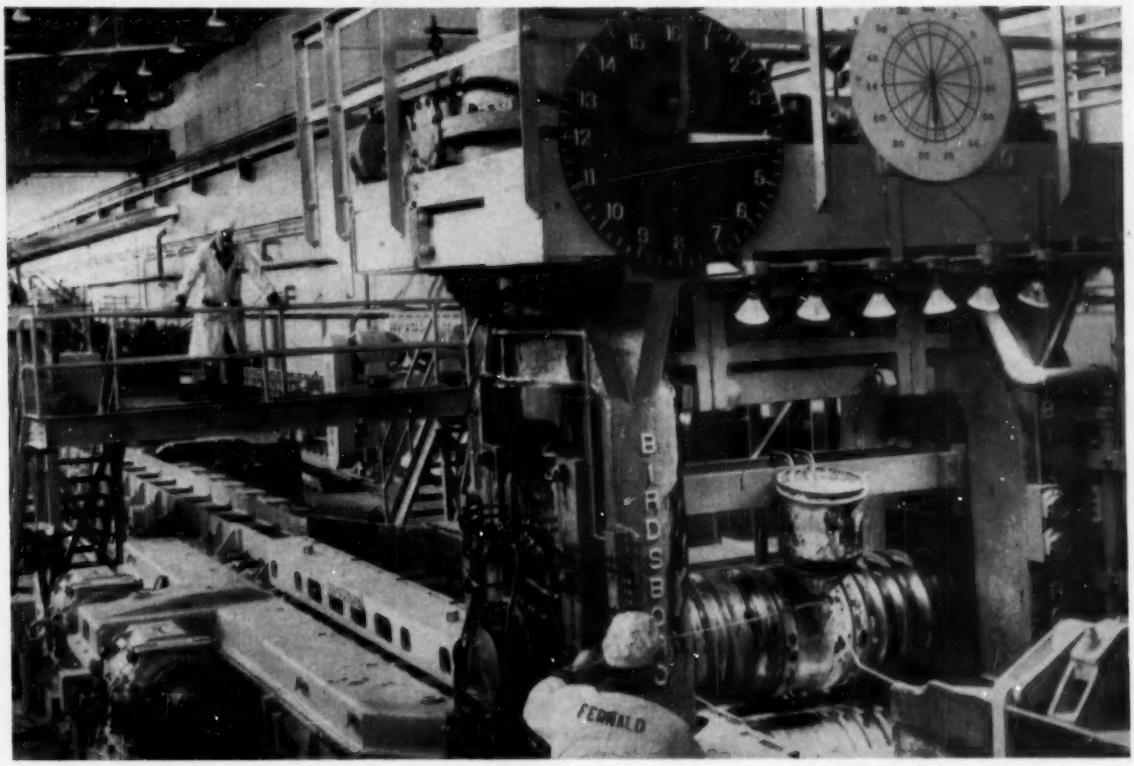
Better Things for Better Living
. . . through Chemistry

POLYCHEMICALS
DEPARTMENT

E. I. DU PONT DE NEMOURS & CO. (Inc.)
WILMINGTON 98, DELAWARE

A-287

PRINTED IN U. S. A.

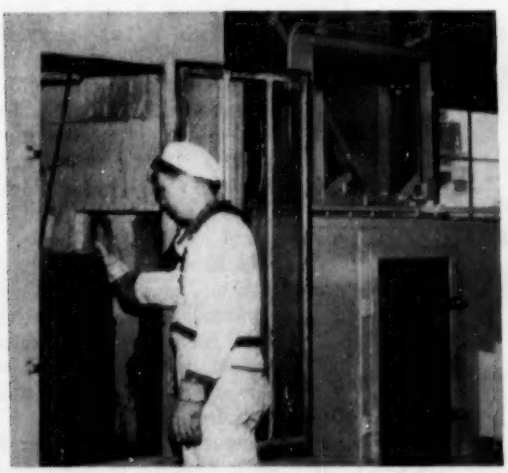


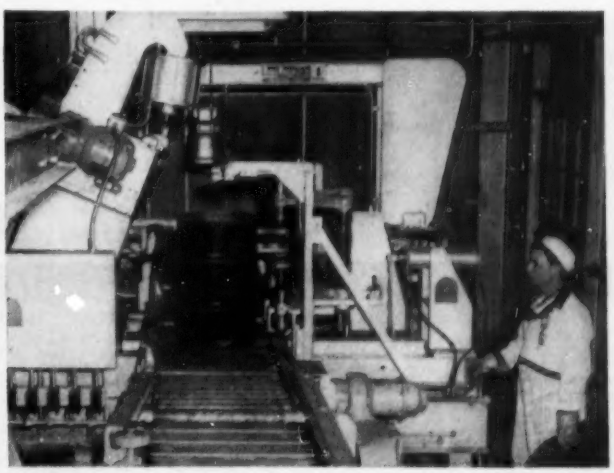
FMPC FINISHING MILL rolls uranium metal into bars for further fabrication into nuclear fuel slugs.

Nuclear Fuels Rest on Process Base

Though there's a world of difference between conventional fuels and those that power atomic plants, they've at least one bond in common: both depend heavily on chemical processing for economic production and efficient utilization. In fact, the atomic fuels just couldn't be made if it weren't for a battery of unit operations that extract the uranium metal in a highly purified form.

Some details of the complex uranium separation process used at AEC's $84-million Feed Materials Production Center (Fernald, O.) have just been released by National Lead Co. of Ohio. Here, in brief, are the essential steps required to coax the hard-to-





FERNALD PLANT teams conventional unit operations with specialized techniques of extracting uranium ore.

Fits into your picture...

ALLIED UNIFORM COMPOUNDING

PRECISION in formulation and compounding of Gilsonite, Pitches and Waxes to the specifications of protective coating manufacturers has been the core of Allied Service for a quarter of a century. Our customers have come to depend upon the uniformity of each compound, made possible by our skilled technicians of long experience.

GILSONITE

ALLIED SUPER SELECTS—Melting point 270°-280° F. Low viscosity, uniform, clean.

FINES—Obtained from Super Selects Ore. M.P. 270°-280° F.

ALLIED E.B. ORE—Melting point 320°-330° F. Medium to high viscosity, uniform, clean.

PITCH COMPOUNDS

OIL EXTENDERS
Black paints • Varnishes
Baking enamels • Industrial paints
Protective coatings • Drying oil pitches
Various blends—processed to definite specifications and melting points.

WAXES

Ozokerite • Ceresine
All types for special uses formulated to order
Wherever Pitches, Gilsonite and Waxes fit into your product picture, call on the Allied agent nearest you.

Allied Asphalt & Mineral Corp.

ESTABLISHED IN 1925
217 BROADWAY NEW YORK 7 • FACTORY DUNELLEN N J

AGENTS AND WAREHOUSE STOCKS IN PRINCIPAL CENTERS

ATLANTA
Deeks & Sprinkel Co.
BALTIMORE
Warner-Graham Co.
BOSTON
Mulcahy & Griffin
BUFFALO
Wetherbee Chem. Co.
CHICAGO
Philip E. Cole Co.
CINCINNATI
Deeks & Sprinkel
CLEVELAND
Norman G. Schabel Co.
DETROIT
D. H. Osgood Co.
HOUSTON
Joe Coulson Co.
KANSAS CITY
John T. Kennedy Sales Co.
LOS ANGELES
E. B. Taylor Co.
LOUISVILLE
Deeks & Sprinkel Co
MONTREAL, CAN.
Wm. J. Michaud Co., Ltd.
NEW ORLEANS
Russell Chemical Co.
PHILADELPHIA
Loos & Dilworth, Inc.
PITTSBURGH
B. Ostroff
PORTLAND, ORE.
Miller & Zehrung Chemical Co.
ST. LOUIS
Harry G. Knapp
SAN FRANCISCO
E. M. Wells
SEATTLE
Carl F. Miller & Co.
TORONTO, CAN.
A. S. Paterson

PRODUCTION. . . . .

get uranium metal out of its ores:

Processing begins with the preparation and purification of orange oxide (uranium trioxide).

Uranium ores and concentrates are dried, ground and classified by conventional means, digested with nitric-acid solution.

From the digester, uranium solution flows to the top of a pulse-type stainless-steel extraction column where uranyl nitrate is separated by countercurrent extraction with a tributyl phosphate-kerosene solvent. As solvent and aqueous feed flow over vertically stacked stainless-steel sieves in the column, a pulsing pump produces turbulence to increase the efficiency of separation.

The solvent solution is fed to a scrubbing column, scrubbed of soluble impurities by the addition of a small amount of water. Next, the purified solvent passes into a stripping column where a large excess of water removes uranium values. The resulting pure uranyl nitrate is then concentrated by evaporation, calcined to produce the orange oxide.

Green-Salt Plant: Converting uranium trioxide into a suitable feed material for the metal refining operation is the job of the green-salt (uranium tetrafluoride) plant.

In this section, mobile hoppers deliver the orange oxide by gravity flow to the uppermost of four horizontal furnaces. Hydrogen gas, produced by dissociation of ammonia, passes counter-current to the feed, reduces it from the trioxide to dioxide.

The UO_2 is then fed through the three remaining furnaces counter-current to anhydrous hydrogen fluoride which converts it into the green salt. Some uranium tetrafluoride is produced by hydrogen reduction of the gaseous hexafluoride received as feed material from gaseous diffusion plants at Oak Ridge, Tenn., and Paducah, Ky. Product UF_4 is pulverized, blended, and packaged for transfer to the metallurgical section.

Thermite Reaction: The refining of uranium metal required as many ingenious processing innovations as did the chemical operations. Metallurgical engineers finally perfected a thermite-type reduction that meets the metal's exacting requirements.

The reaction takes place in a lined, metal bomb. Uranium tetrafluoride is blended with a reducing agent, charged

Dependable Source for Chemical Raw Materials

Theron S. Dodson plans raw-material purchases to meet Barium Reduction's rising sales needs.

"Wyandotte's reliability helps us serve our many customers better"

– says Theron S. Dodson, purchasing agent, Barium Reduction Corporation, S. Charleston, W. Va.

"The barium chemicals we make are vital to many industries," states Theron S. Dodson, Barium Reduction Corporation. "For example, they are used in the manufacture of television tubes, electric light-bulb sockets, and molded rubber products – also in atomic research. All of these industries have their own peaks and valleys of production, and their demands on us vary.

"As a result, we have to have suppliers who can meet our ever-changing needs for raw materials – and meet them on time. Our suppliers must be able to meet our specifications, too. Anything less than the high-quality we require would only slow up our delivery, or cause trouble for our customers. I can assure you that we always receive excellent service and quality products from Wyandotte. When they say a car of soda ash or caustic soda is shipped, we can schedule our production on it."

Are you seeking a reliable source for chemical raw materials . . . a concern that believes in continuous programs of product development to serve many industries?

If you are, you'll find the people at Wyandotte good people to do business with. Experience with Wyandotte's products will prove their quality consistently uniform . . . and Wyandotte's service to your liking.

Why not talk over your requirements with a Wyandotte representative? You'll find a wealth of technical data available – as well as a willingness to work with you in applying our products to your needs. Or write us, giving as many details as possible about your problem. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

Wyandotte CHEMICALS

Soda Ash • Caustic Soda • Bicarbonate of Soda • Chlorine
Muriatic Acid • Calcium Carbonate • Calcium Chloride
Glycols • Chlorinated Solvents • Synthetic Detergents
Other Organic and Inorganic Chemicals

DAY JUMBO MIXERS . . . meet every requirement for maintaining a thorough blend of chocolate products under sanitary conditions at The Nestlé Company, Inc., Fulton, N. Y. For instance: seals may be furnished of sanitary construction requiring no packing, and of such simple design as to permit thorough cleaning in a matter of minutes between batches—(no more black specks working into product from stuffing boxes).

Outboard bearings on all models allow plenty of room for normal cleaning and maintenance. Special agitators available for blending high shortening content products. Heating or cooling jackets, dust covers and many other optional features available. For complete information write for Bulletin 800.

FOUNDED 1887

in mixing equipment **DAY** *means longer life span*

THE J. H. DAY COMPANY
INCORPORATED
4932 BEECH ST., NORWOOD, CINCINNATI 12, OHIO
Division of Cleveland Automatic Machine Company

Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products.

Eastern Canada: Brantford Oven & Rack Co., Ltd., Brantford, Ontario
Western Canada: British Canadian Importers, Vancouver, British Columbia
Mexico: T. de la Pena e Hijos, S.A., Nazas 45-A, Mexico 5—D.F.

into the bomb, and heated in a furnace. Green salt is reduced to metal, emerges from the bomb after cooling as a uranium "biscuit."

The metal is further refined by placing the biscuits in a graphite crucible, heating to the melting point in a vacuum induction furnace, and casting in graphite ingot molds.

Ingots of uranium are rolled into billets and rods in much the same way as steel is handled. Automatic screw machines cut and smooth the straightened rod into slugs of precise dimensions. After cleaning, trichlorethylene degreasing, nitric-acid dip, and a rinse, the slugs are ready for shipment to various AEC reactor sites.

Waste Recovery: While the FMPC is chiefly concerned with the production of high-purity uranium metal, its processing operations aren't limited to just that phase of the business. Recovery of scrap and process by-products also comes in for special consideration to ensure maximum economic utilization of materials.

For example, raffinate from the ore extraction stage is concentrated and spray-calcined to recover nitric-acid values and powdered oxides of various metals. Nitric values are also collected from uranyl nitrate calcining, transferred to a nitric-acid recovery system.

Hydrogen fluoride from the green-salt plant is reprocessed through two refrigeration systems. The first removes 70% HF, which is sold back to the vendor; the second reclaims usable anhydrous HF for recycle to the furnaces.

In a special uranium-scrap plant, waste metal from fuel-slug fabrication is converted back into raw feed to be combined with ore and concentrates. Together with metal scrap from other atomic-energy installations, it's crushed and ground, leached with hydrochloric acid, precipitated with ammonia (as ammonium diuranite), oxidized in a muffle furnace to black oxide (U_3O_8).

Still Growing: Despite its technical and economic success, the Fernald plant is still undergoing changes. A soon-to-be-completed $20-million expansion will make sizable additions to the FMPC's production, health, and safety facilities. But engineers continue to search for improved processing techniques, won't be satisfied until even the best existing procedures are replaced by more-efficient ones.

PETRONATE

(Reg. U. S. Pat. Office)

. . . the oil-soluble petroleum sulfonate for all four major functions . . .

A Emulsification and Dispersion of Liquids

B Dispersion and Wetting of Solids

C Wetting and Dispersion of Liquid-Solid Systems

D Inhibition of Rust and Corrosion

PETRONATE is the general trade name given by Sonneborn to its various types and grades of oil-soluble petroleum sulfonates.

The chart suggests the broad range of uses for this material. A laboratory sample of PETRONATE will help you determine how its many advantages can be put to efficient use in your manufacturing processes.

Check the coupon below indicating the use intended so that we can send you the proper type of PETRONATE.

USES OF PETRONATE

APPLICATION	PRIMARY FUNCTION OF PETRONATE	SECONDARY FUNCTION
EMULSIFICATION AND DISPERSION OF LIQUIDS		
1. Insecticide Emulsions	Emulsifying Agent for Toxicant	Spreading Agent
2. Textile Oils	Emulsifying Agent for Textile Processing Oils	Wetting and Dispersing Agent for Textile Fibers
3. Leather Oils	Emulsifying Agent for Leather Processing Oils	Wetting and Dispersing Agent for Leathers
DISPERSION AND WETTING OF SOLIDS		
4. Rubber Manufacture	Thermo Plasticizing Agent	Increases Dispersibility of Filler
5. Fuel Oil	Keeps Sludge in Suspension	Prevents Segregation of Moisture
6. Printing Ink Manufacture	Aids dispersion of pigment	Reduces Viscosity of Ink
7. Ore Flotation	Flotation Reagent	Selective Wetting Agent
8. Additives for Lube Oil	Acts as Detergent	Inhibits Bearing Corrosion
WETTING AND DISPERSION OF LIQUID-SOLID SYSTEMS		
9. Crude Oil Emulsion Splitting	Reverting Agent for Water-in-Oil Emulsions	Aids in Wetting out Salts and Solids
10. Emulsifiable Solvent Cleaners	Dispersing Agent for Oil and Grease Deposits	Acts as Emulsifying Agent
11. Dry Cleaning Compounds	Linking agent for Water and Solvent	Loosens Dirt Absorbed by Fabric
12. Fat Splitting Process	Dispersing Agent for Solid Fats	Acts as Wetting Agent
INHIBITION OF RUST AND CORROSION		
13. Corrosion Preventive Compounds	Rust and Corrosion Inhibiting Agent	Acts as Moisture Barrier
14. Anti-Freeze Solutions	Rust and Corrosion Inhibiting Agent	Aids in Dispersion of Scale
15. Soluble Cutting Oils	Emulsifying Agent for Mineral Oil	Rust Inhibitor

L. SONNEBORN SONS, INC.

New York 10, N. Y.

White Oil and Petrolatum Division, L. SONNEBORN SONS, INC.
300 Fourth Avenue, New York 10, N. Y.

Please send sample of PETRONATE suitable for use indicated below (circle number corresponding to use in chart above).

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Name_____

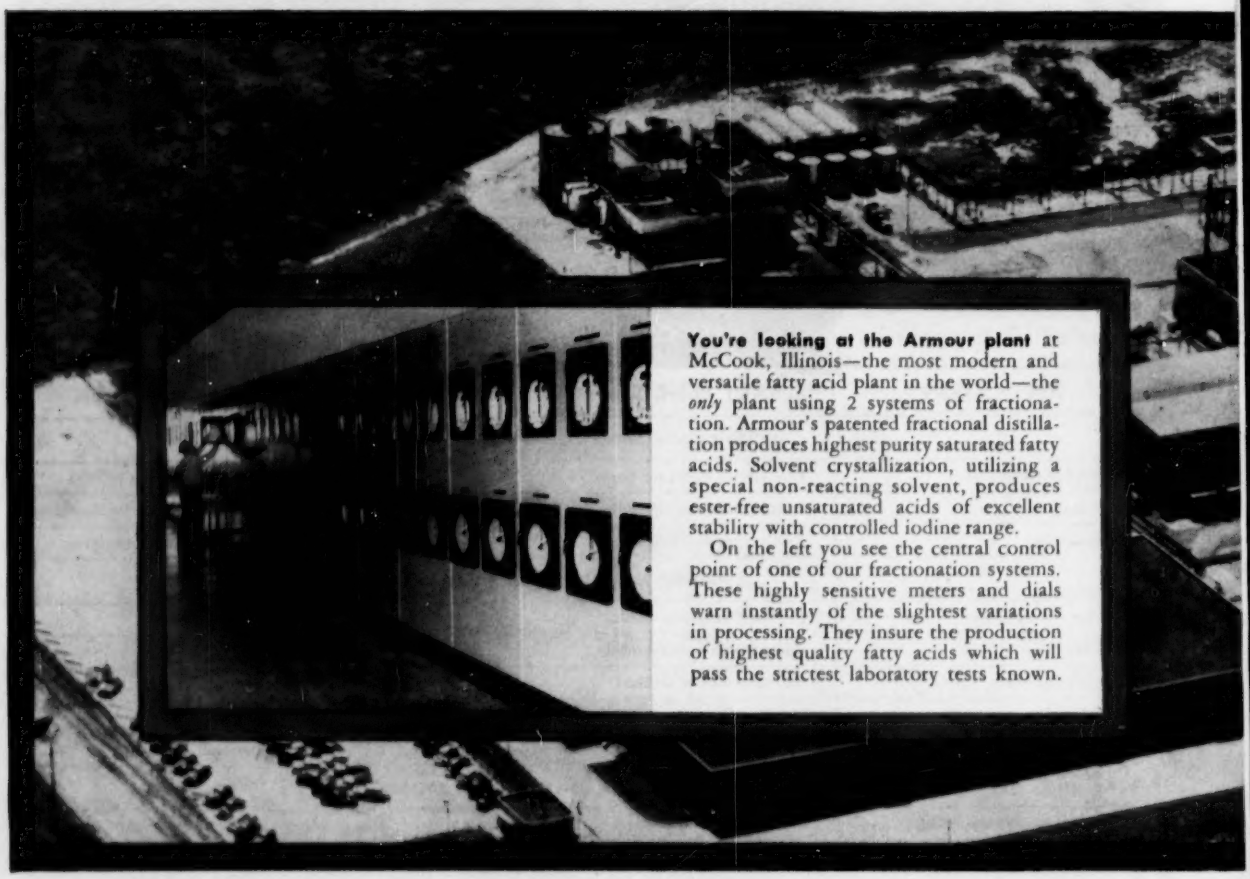
Company_____

Address_____

City_____ P.O. Zone_____ State_____

2-SYSTEM FRACTIONATION

produces highest purity fatty acids



You're looking at the Armour plant at McCook, Illinois—the most modern and versatile fatty acid plant in the world—the *only* plant using 2 systems of fractionation. Armour's patented fractional distillation produces highest purity saturated fatty acids. Solvent crystallization, utilizing a special non-reacting solvent, produces ester-free unsaturated acids of excellent stability with controlled iodine range.

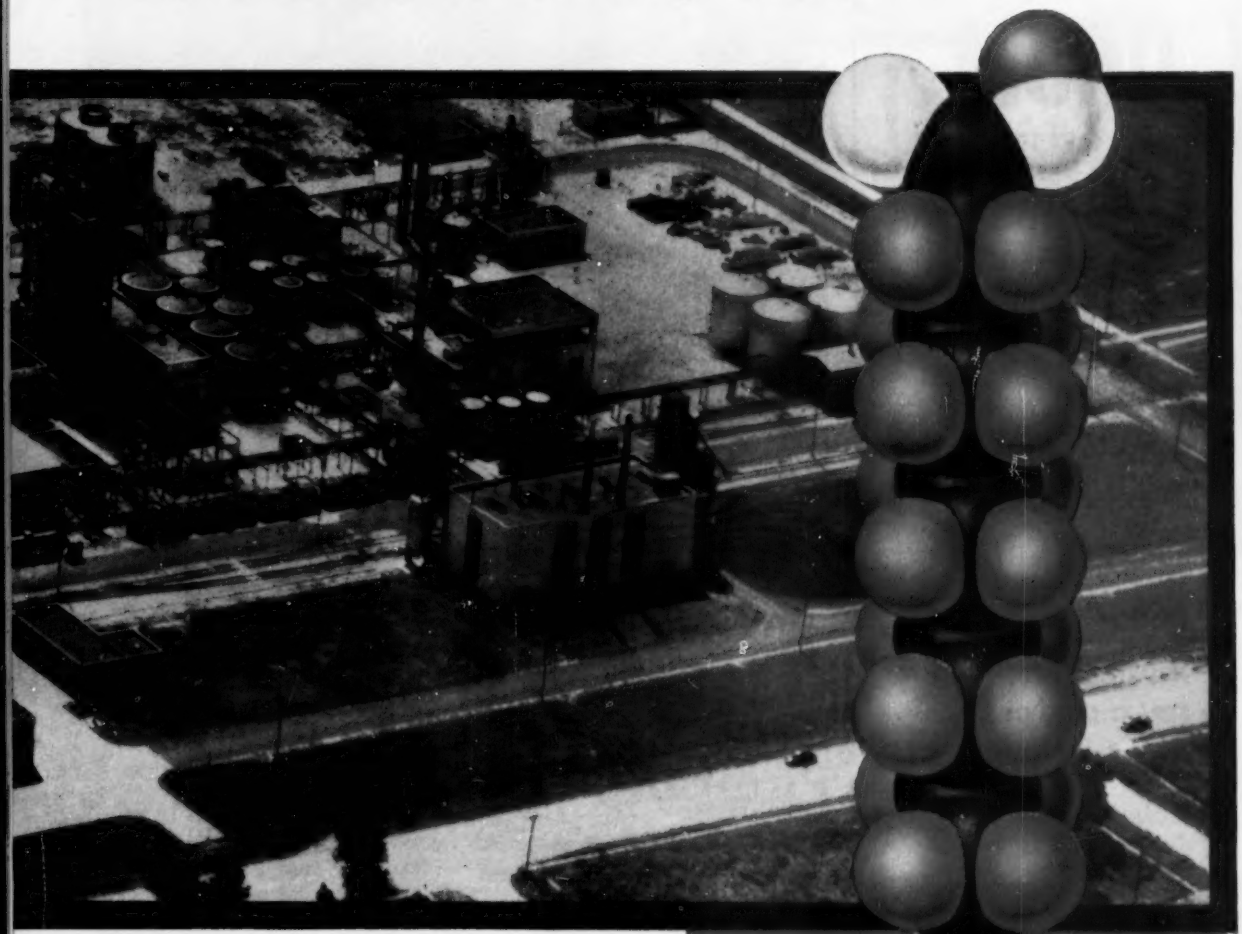
On the left you see the central control point of one of our fractionation systems. These highly sensitive meters and dials warn instantly of the slightest variations in processing. They insure the production of highest quality fatty acids which will pass the strictest laboratory tests known.

To keep up in today's competitive market, your company must be constantly developing new and improved products as a key to sales growth. New ways must be found to maintain high quality despite rising production costs. Here is how Armour can help you meet this challenge. *For research men,* Armour can supply purest components to simplify the approach to any problem involving fatty acids. *For production men,* Armour can supply tank-car quantities of these consistently uniform, high purity Neo-Fat® fatty acids. Their constant composition means greater uniformity in processing. *For purchasing agents,* since Armour is basic in fats, we can supply the most complete and versatile line of fatty acids at competitive prices. Already, the high purity of Armour Neo-Fats has benefited a wide variety of industries. For example, one of the pure component Armour Neo-Fats has enabled the vinyl plastics industry to decrease acid consumption while increasing the stability of the final plastic. And in grease manufacturing, the constant composition of Armour Neo-Fats has aided the development of multi-purpose greases, thus simplifying grease processing and reducing inventories. You, too, may find the answer to your production and sales problems in the high purity of Armour Neo-Fats.

You can order a specific Neo-Fat without buying other mixed-in acids that are wasteful or harmful to your formulations. The Armour line includes saturated fatty acids from 8 carbon chain lengths through 18, as well as various unsaturated acids. Order either by specification or by composition. The booklets and chart offered at right will help you find ways to put Armour Neo-Fats to work for you. Put the coupon in the mail today

—used exclusively by Armour—

in any quantity—for every need!



ARMOUR
CHEMICAL
DIVISION

© Armour and Company • 1355 West 31st Street • Chicago 9, Illinois

MAIL THIS COUPON WITH YOUR LETTERHEAD TODAY!

ARMOUR CHEMICAL DIVISION
1355 West 31st Street, Chicago 9, Illinois

Please send me:

- ☐ Coconut Oil Fatty Acid Booklet
- ☐ Neo-Fat Specifications Chart
- ☐ Chemistry of Fatty Acids Booklet
- ☐ Testing of Fatty Acids Booklet
- ☐ Selection of Fatty Acids Booklet

Name ..... Title .....

Firm .....

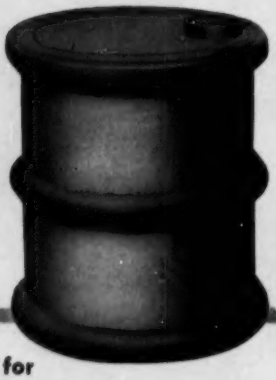
Address .....

City ..... Zone ..... State .....

CW 9-24

ALL RUBBER DRUM

SAFE AND EASY TO HANDLE!
NO METAL
NO BREAKAGE



for

- MURIATIC ACID
- HYDROFLUORIC ACID
- FERRIC CHLORIDE
- CORROSIVE LIQUIDS

★

ICC-43A SPEC.
Tare Weight—34 lbs.
13 gallon capacity

★

Made with
Natural, Neoprene,
Butyl or other Synthetic
Rubber Linings

★

Threaded or Stopper type closures

THE GENERAL TIRE & RUBBER COMPANY
MECHANICAL GOODS DIVISION
WABASH, INDIANA

Distributed by **THE C. P. HALL CO.**
5147 W. 67th St. • CHICAGO 38, ILL.
AKRON, O. • • CHICAGO, ILL.
NEWARK, N. J. • LOS ANGELES, CAL.

A fireman would fault his technique. But Jerome Murray hasn't stormed up the ladder to pump water on a fire. With his latest invention (on the ladder and in the closeup), he's merely . . .

Pumping Up a Storm

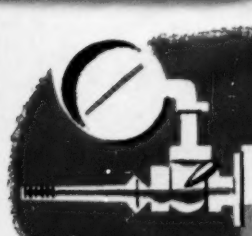
Actually, even a school boy could tell Jerome Murray that he isn't going to get much water on a fire with the hose he's using. But Murray isn't interested in quantity. He's simply showing off—for *CW*'s benefit—the high heads developed by his new pump.

What Murray has done is to take an old (and fairly popular) idea, incorporate some design features and emerge with a working model of a pump that could have some significant applications in the process industry. The pump consists of a flexible hose nesting inside a circular frame. A pair of rollers in the middle of the frame, when rotated, squeeze the hose for the pumping action.

Murray says that models of the pump, when used for moving liquids, have delivered pressures up to 1,500 psi. Or, as vacuum pumps, they have pulled a steady 30 in. of mercury.

Some of Murray's other claims: Since it's a closed system, it requires no packing. Although the feed rate can be held remarkably close, it can be altered either by changing the speed of the drive or by using a hose of different diameter. Also, the fact that all the parts except the rollers can be stamped should make manufacturing costs low. And by using two pieces of hose inside the frame, the pump can be driven by another moving liquid.

These and other features, Murray feels, should make his gadget a workhorse in industry and in consumer items. But all this is largely academic for the present; Murray, with his own consulting firm (The Jerome Murray Corp., New York), has neither the funds nor the inclination to manufacture it.



Before the end of 1955, GAF's new HIGH PRESSURE ACETYLENE DERIVATIVES plant at Calvert City, Kentucky will be on stream. These derivatives are now offered in quantities up to and including tank cars from semi-works production at Linden, New Jersey.

Among these products now giving proven industrial performance:

1,4-BUTANEDIOL A GLYCOL WITH PLUS VALUES IN PLASTICIZERS, POLYESTERS, POLYURETHANES $HOCH_2CH_2CH_2CH_2OH$

In plasticizers for polyvinyl chloride—1,4-Butanediol gives properties unobtainable with the shorter length glycols. For example, a 1,4-butanediol-adipic acid plasticizer tested against standard polymeric plasticizers shows excellent resistance to migration, outstanding ease of incorporation into the polymer, good low temperature properties.

In polyurethanes—1,4-Butanediol reacted with diisocyanates gives polyurethanes of high tensile strength, outstanding hardness, and low water absorption.

In polyesters—1,4-Butanediol has given resins, fibers, finishes, and lacquer raw materials of superior physical properties.

In other uses—1,4-Butanediol is a solvent and humectant in inks...is a chemical intermediate for solvents, pharmaceuticals, and vinyl monomers.

Properties—Almost colorless, odorless liquid, f.p. range 18-19.5°C, b.p. range 221-231°C, not a skin irritant or sensitizer, infinite solubility in water, alcohol, acetone.

2-BUTYNE-1,4-DIOL A SYNTHETIC BUILDING BLOCK AND CORROSION INHIBITOR $HOCH_2C{\equiv}CCH_2OH$

In synthesis—Butynediol reacts smoothly as a glycol or a disubstituted acetylene—Important reactions include conversion to dihalides which in turn yield diacetylene...isomerization to hydroxymethyl vinyl ketone...trimerization to hexamethylolbenzene.

As a Corrosion Inhibitor—Butynediol is effective alone or in blended formulations as a corrosion inhibitor for mineral acids, especially sulfuric acid.

Properties—White solid, m.p. 57.5°C, b.p. 140°C (10 mm.). Also available as 35% aqueous solution.

Other Promising New Products Available in Development Quantities

2-BUTENE-1,4-DIOL
$HOCH_2CH{=}CHCH_2OH$

1,2,4-BUTANETRIOL
$HOCH_2CHOHCH_2CH_2OH$

For technical information, price schedules and samples please write to:

GENERAL ANILINE & FILM CORPORATION
COMMERCIAL DEVELOPMENT DEPARTMENT
435 HUDSON STREET, NEW YORK 14, N. Y.

gaf

From Research to Reality

FMC CHEMICALS

Have you heard about our worldwide chemical operations?

Few realize the extent of FMC Chemical Divisions' expanding activities in world markets:

1 We export many of the 400 FMC Chemicals through our New York Export Office.

2 We import many chemical raw materials and botanical insecticides.

3 We make FMC chemical and insecticide processes available for overseas manufacturing and formulating operations.

4 FMC technical personnel continuously cover world chemical centers seeking processes and developments that will benefit our customers.

Because of our far-reaching activity in foreign trade and manufacturing, sales representation in world trade centers and an active interest in mutual licensing agreements, we can efficiently serve your overseas chemical requirements.

An FMC Chemical Divisions' EXPORT PRODUCT LIST will be sent upon request.

fmc
FOOD MACHINERY AND CHEMICAL CORPORATION

Chemical Divisions

FOOD MACHINERY AND CHEMICAL CORPORATION

Administrative Offices • 161 East 42 St, New York 17

Westvaco CHEMICALS

WESTVACO CHLOR-ALKALI DIVISION
New York, New York
Alkalis, Chlorinated Chemicals, Carbon Bisulfide

BECCO CHEMICAL DIVISION
Buffalo, New York
Peroxygen Chemicals

Niagara

NIAGARA CHEMICAL DIVISION
Middleport, New York
Insecticides, Fungicides and Industrial Sulphur

OHIO APEX

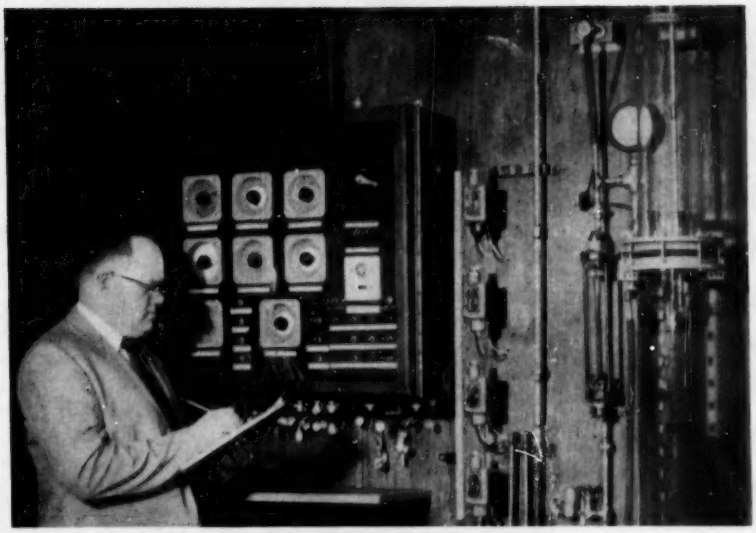
OHIO-APEX DIVISION
Nitro, West Virginia
Plasticizers and Chemicals

FAIRFIELD

FAIRFIELD CHEMICAL DIVISION
New York, New York
Pesticide Compounds and Organic Chemicals

Westvaco CHEMICALS

WESTVACO MINERAL PRODUCTS DIVISION
New York, New York
Phosphates, Barium and Magnesium Chemicals



RAYONIER'S GRAY: Conversion is the key.

Triple Play in Pulp

The happy marriage of chemical processing to the pulp and paper industry *(CW Report, p. 44, this issue)* **is blessed with another offspring this week as Rayonier puts the finishing touches on an ion exchange process of separating lignosulfonates from waste sulfite pulping liquor.**

Rayonier has disclosed no commercial plans for the process as yet. It merely says that it is pilot-planting the method (at Shelton, Wash.) to get products for market evaluation. Market studies when complete will dictate the size of the commercial operation.

By modifying a commercial ion exchange resin (supplied by Chemical Process & Co., Redwood City, Calif.), Rayonier has succeeded in adsorbing high-molecular-weight compounds selectively over a narrow molecular range. The porous resin, weakly basic, it feels, is important in its own right. For instance, it might be employed in the pharmaceutical field to isolate fermentation complexes. But Rayonier has no intentions of making the resins; instead will license the process to others. (Chemical Process, in fact, is already making its Duolite A-2 in the modified form.)

The Process: Covered by patents (U.S. Pat. 2,710,254 and 2,710,255), the process, according to Rayonier, is equally adaptable to calcium-sodium- and ammonia-base sulfite waste liquors or acid sulfite prehydrolysis liquors. (Resin life, however, is longer with ammonia; product color is lighter with prehydrolysis liquors.) Other claims for the process made by Rayonier: pure lignosulfonate fractions can be isolated; inorganic pulping chemicals are recovered for recycle and heat values in the waste liquor are also recovered. Also, of course, pollution problems are minimized.

Other methods of separating lignosulfonates depend on dialysis or precipitation. Marathon Corp., for instance, one of the big lignosulfonate producers, precipitates the sulfonic acids present in the spent liquor as the calcium salt by treatment with lime (*CW, Feb. 7, '53, p. 42*). (Marathon has recently been experimenting with an ion exchange process, also.)

Rayonier's new process consists of a steam stripping to remove sulfur dioxide and then adsorption of the lignosulfonates on the special anion exchange resin. This fraction is recovered when the resin is regenerated with a 5% solution of caustic. The excess caustic and metal impurities, principally calcium, are adsorbed on a carboxylic acid cation exchange resin. That, in turn, is regenerated by the sulfur dioxide obtained from the original steam-stripping.

Sugars, metallic ions and unad-

ARGO®
POLYOSES
POLYOSES
A NEW GROUP OF SYNTHETIC WATER-SOLUBLE ADHESIVES
For Use in:
PREPARED PASTES
REMOISTENING GUMS
PAPER LAMINANTS
MUCILAGE FORMULATIONS
ARGO BRAND POLYOSES are available in several viscosity grades. Send for your copy of our POLYOSE Technical Bulletin.
CHEMICAL DIVISION
CORN PRODUCTS REFINING COMPANY
17 BATTERY PLACE
NEW YORK 4, NEW YORK

YOUR CHEMIST can

LIFT THE CURTAIN
to FIND
NEW PRODUCTS
NEW PROCESSES
NEW FORMULATIONS
IMPROVEMENT OF CURRENT ONES

thru:

UBS HYCRYL A-1000

Reg. T.M.

an acrylate offering unusual features

> WATER SOLUBILITY > FILM FLEXIBILITY
> POSITIVE SUSPENSION OF TROUBLESOME PIGMENTS

This water resistant pigment suspension medium has a remarkable variety of profitable uses already discovered.

- IN SPECIALTY PAPER COATINGS
- IN AUTOMOBILE POLISHES
- IN WATER RESISTANT WALLPAPER COATINGS
- IN PIGMENT GRINDING
- IN TANNERY FINISHES
- IN LATEX COMPOUNDING (Natural, or Synthetic)
- IN AQUEOUS DISPERSIONS OF PIGMENTS AND FILLERS
- IN INTERIOR LATEX PAINTS
- IN THICKENING AND VISCOSITY STABILIZING APPLICATIONS

BUT!

More uses AWAIT DISCOVERY in any process requiring a particle suspending or stabilizing medium with high water resistance, which maintains its medium viscosity ranges in various environments, resists putrefaction and is non-toxic and colorless.

EXPLORE the possibilities latent in UBS HYCRYL A-1000 FOR YOUR PRODUCTS

UBS welcomes your inquiry and the opportunity to discuss your Hycryl A-1000 applications.

UBS UNION BAY STATE *Chemical Co., Inc.*
491 MAIN ST., CAMBRIDGE 42, MASS.

Reg. T.M.

sorbed lignosulfonates that pass through the anion exchange column are combined with the excess sulfite waste liquor for evaporation and combustion. In a closed-cycle pulping operation, effluent from the regeneration of the cation exchange resin could be returned to the pulping liquor make-up tanks.

The secret of the success of the process, of course, is the weakly basic, highly cross-linked, porous, amine anion exchange resin. In general, such resins have been used only to adsorb relatively simple ions as in water conditioning. In addition, it's usually been considered necessary to remove all metal cations prior to adsorption.

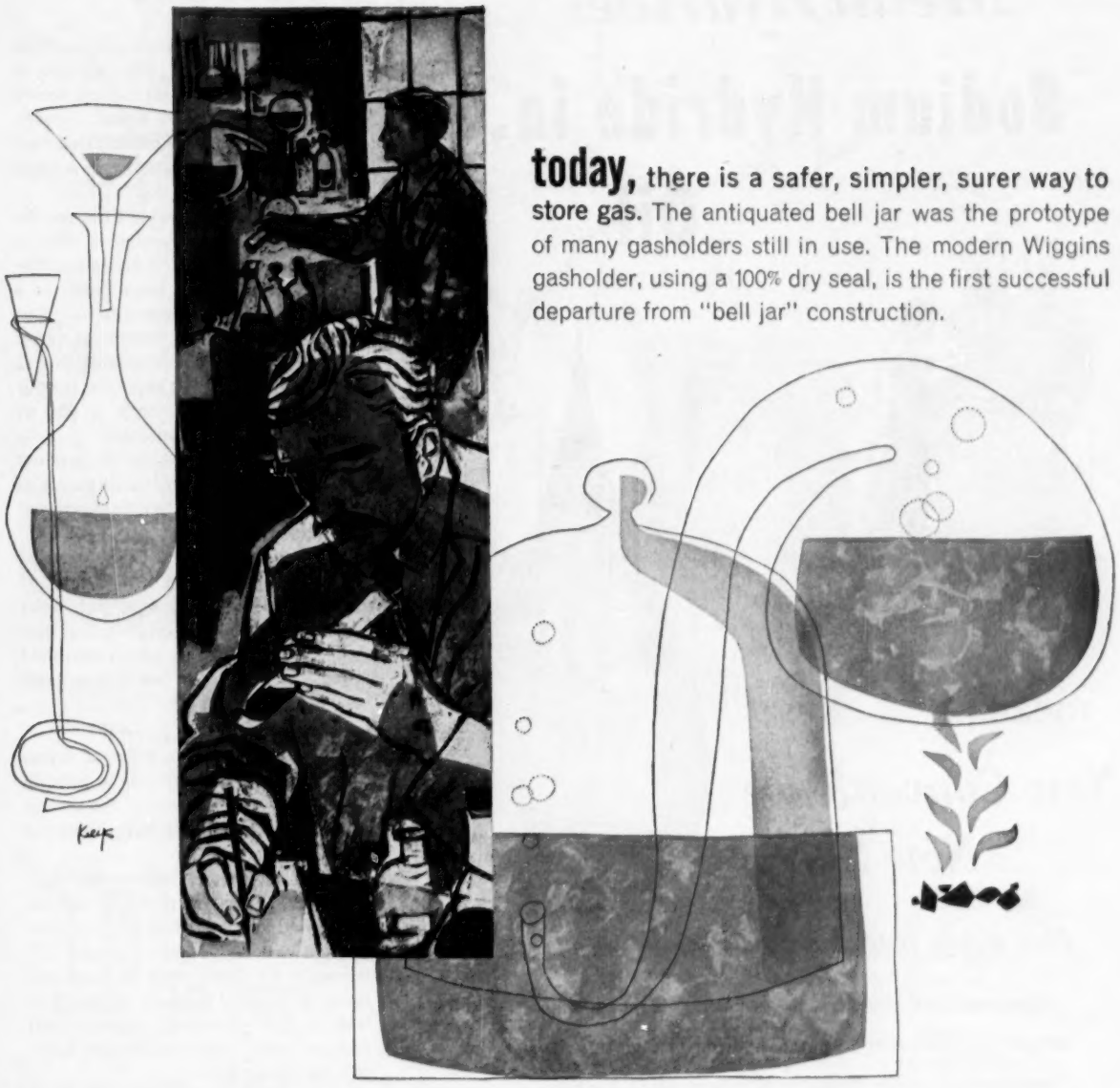
Rayonier's Research Supervisor Kenneth Gray and his colleagues at Shelton set out, however, to find whether the large lignosulfonate anion couldn't be adsorbed from the liquor without first removing the metals. They found it would, provided the resin contained tertiary amine groups but no primary or secondary ones. Also, they found that a carboxylic acid resin, rather than a sulfonic acid type, must be used to adsorb the excess caustic used for regeneration because the latter won't remove metallic cations from the lignosulfonate products.

The reason why primary or secondary amino groups interfere with the reaction is that reducing groups in the liquor cause condensation reactions in the resins. Quaternary groups are bad, too, because they make the resin too basic, cause a precipitate in the effluent and hamper the regeneration efficiency of the caustic.

Gray was able to develop a resin eliminating these unwanted groups and effecting the necessary compromise between heavy cross-linkage (for dimensional stability) and high porosity (for high capacity).

Says he: "The key to the whole resin business is the conversion of the nitrogen into tertiary form without forming even small amounts of quaternary ammonium groups." This he accomplished by a process (now being patented) consisting of treating a standard commercial resin (Duolite A-2) with a mixture of formic acid and formaldehyde.

In a typical run, for instance, 100 grams of the resin are converted into the free base by reacting it with caustic, draining it and then mixing it with

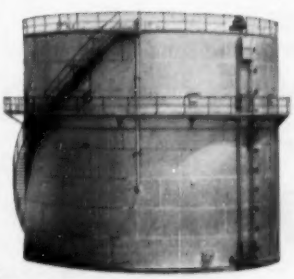


today, there is a safer, simpler, surer way to **store gas.** The antiquated bell jar was the prototype of many gasholders still in use. The modern Wiggins gasholder, using a 100% dry seal, is the first successful departure from "bell jar" construction.

WIGGINS GASHOLDER

BY GENERAL AMERICAN

Only modern Wiggins Gasholders free you from weather worries and operating costs. More than 150 satisfied users now enjoy the advantages (no water, tar or grease) that this 100% dry-seal gasholder offers. The Wiggins Gasholder can be built to any capacity . . . with remarkable savings in construction cost. If there's a gas storage structure in your firm's future, write today for full information.



for chemical process and industrial gases

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street
Chicago 90, Illinois

Offices in Principal Cities

Metal Hydrides'

Sodium Hydride in... Oil

means

New Convenience

New Safety

Plus higher yield, lower cost condensations

This new Metal Hydrides' reagent is a *ready-made dispersion* of micro-range sodium hydride crystals in oil. It means a safer, easier method of handling sodium hydride than possible with the ordinary dry powder. A semi-dispersion requiring no complicated preparation—Metal Hydrides' sodium hydride is ready-to-use———just pour from the shipping container directly into your reaction system.

Take advantage of the higher yields now possible at lower cost. Contact Metal Hydrides sales engineers *now!*

PIONEERS IN HYDROGEN COMPOUNDS

MH **Metal Hydrides** INCORPORATED

924 Congress St., Beverly, Mass.

PRODUCTION. . . . .

22 grams of 90% formic acid and 150 grams of formalin. The mixture is warmed slowly to 190 C and heated with agitation for 6½ hours. Finally, the resin is washed, reconverted into basic form (with caustic) and washed again.

The Product: By use of the ion exchange method, Rayonier is able to recover about 20% of the lignosulfonates present in the spent liquor as a 15% sugar-free lignosulfonic acid covering the narrow molecular range of 1,200-1,600. Commercially, it will probably concentrate that to a viscous solution of 40-60% with a pH of around 5 for optimum color.

It envisions markets for the product in concrete mixing and other places as dispersant, also as a starting material for aromatic synthesis (e.g., vanillin). It will probably find the marketing of lignosulfonates a long row to hoe. If it succeeds in making them pay, however, it will have completed a nice triple play by moving into a new field with a new process and a new resin that makes it possible.

•

Fire Fighters: Fast, efficient action is half the battle when you're fighting plant fires. Here's some of the newest equipment designed to help industrial firemen:

• Akron Brass Mfg. Co., Inc. (Wooster, O.) offers two new nozzles that provide all degrees of fog plus straight streams of water. Model 711 is made for hose rack and cabinet units, is said to function particularly well at low pressures. Model 1300 features heavy-duty construction, high-gallonage capacity.

• Ward LaFrance Truck Corp. (Elmira, N. Y.) has engineered a new 500-gpm. pumper truck specifically for combating industrial blazes. Dubbed the Fire Ball Special, the pumper comes equipped with foam for fighting oil fires, or with CO_2 and nitrogen-forced dry chemical agents for use in chemical plants.

•

Ammonia Burns: Handy treatment for anhydrous or liquid ammonia burns now comes in kit form from E. D. Bullard Co. (San Francisco). Packaged in a weatherproof, dustproof case, the kit contains four 4-oz. bottles of Neutralize—a colorless, odorless liquid that counteracts the effects of ammonia on skin or in eyes. Also included: first-aid materials.

"F" is for Faster-Selling chemical products

Few packages can match the sales appeal of Continental's "F" style cans. Their sturdy, easy-to-use construction is a selling point in itself. When our master lithographers add color and design, your polishes, waxes, etc. are groomed for success in heaviest competition.

As for deliveries, you name the date. Tailor-Made Package Service guarantees all the "F" style cans you need, in sizes from four-ounce (spout top) to gallon, at *your* convenience. Continental research and engineering services are available to help you with any problem, large or small.

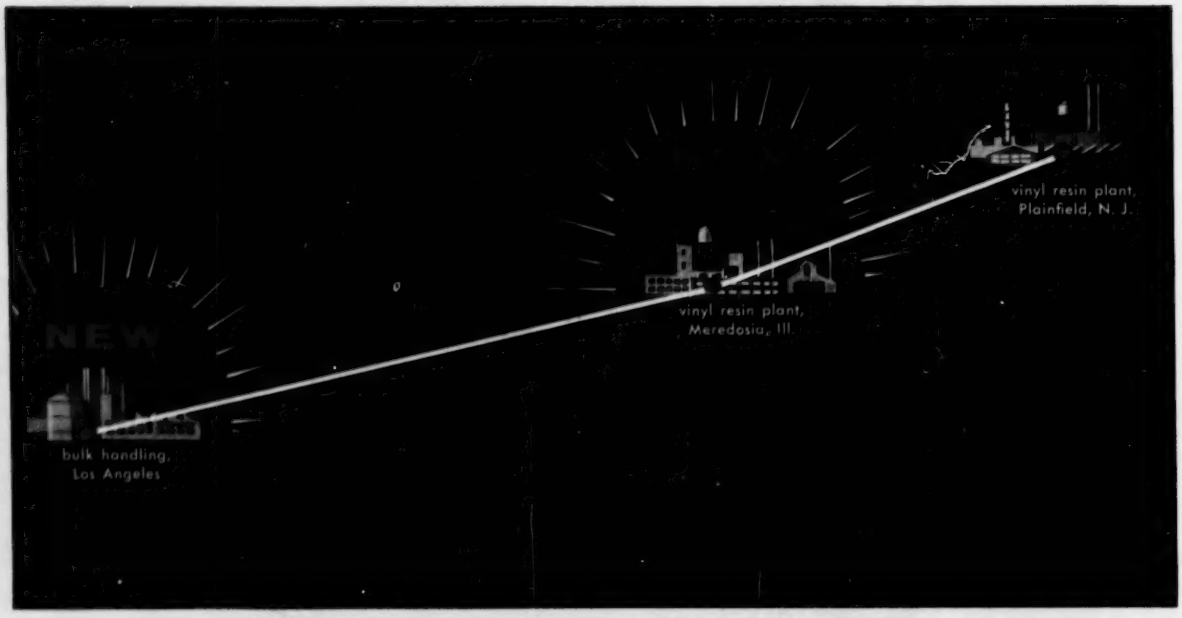
Why not see what "F" style cans can do for your chemical product? Simply phone your nearest Continental office. It will be a pleasure to talk with you.

Fifty Years of Tailor-Made Packaging

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

News about National's Vinyl Solutions and Emulsions



STILL MORE!...FASTER!

For the third time in three years, National again is expanding its facilities for vinyl polymer and copolymer emulsions and solutions.

This time it's:

1—*increased capacity at Plainfield, N. J.*

2—*a second vinyl plant at Meredosia, Illinois.*

3—*bulk handling at Los Angeles.*

This means still more vinyls for adhesives, textiles, paints, paper and other products. And it reflects our growth in the fast expanding resin field.

Too, deliveries will be faster. From Meredosia, Los Angeles or Plainfield. With all customers enjoying the equivalent of two sources of supply.

Our resin chemists will be happy to supply the details. Just get in touch with your nearest National office.

RESIN DIVISION

National STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

Salary Poser: How to Cope with the "Better Offer"

It's no secret that premium starting salaries for each new crop of graduates are a source of discontent among experienced researchers, whose paychecks haven't swelled apace. Keenly sensitive to alleged salary inequities, these older hands frequently are ripe for offers of more money from other firms. Switching jobs, for many, is an appealing way to bolster income and salve ego at one fell swoop. This is the crux of one of the chemical industry's most serious morale problems. How research leaders are meeting the challenge is revealed in exclusive *CW* interviews with Colgate's Arthur Fox and Pfizer's Jasper Kane*.

* Research director of Colgate-Palmolive, Fox is headquartered at the company's Jersey City, N. J., laboratories. Kane is vice-president in charge of research and development at Chas. Pfizer & Co. (Brooklyn, N. Y.).

"Never meet an offer of more money on the spot." . . . says Colgate's Fox.

"Go ahead, son, we don't want to stand in your way." . . . says Pfizer's Kane.

"While high turnover because of salary inequities has eased somewhat (it was particularly severe a couple of years ago), it's likely to be a continuing headache for research directors.

"When approached by a staffer who has had an offer of more money from another company, we never meet it on the spot. Do that," avers Fox, "and you're sunk in your effort to preserve any order in the salary pyramid.

"What we do is tell him what we think his future within the company will be. If he's in line for a promotion in the near future, say the next 3 to 6 months, we may tell him so. But if we think the new job is better for him than the one he's got, we'll encourage him to take it—even if he's one of our best men.

"Such encouragement isn't entirely altruistic. You can't keep a man functioning at his best if you've done him an injustice. He's sure to find it out and resent it.

"Even in the case of the exceptionally qualified man

"High starting salaries haven't had much effect on salary structures here. That's because we try to adjust for them by annual salary reviews for each researcher. Some inequities may arise, but we don't let a man go along for 2 or 3 years before suddenly finding out his salary is out of line.

"We usually conduct these reviews around November and December. They are joint affairs between the research division head and the personnel department. Results, moreover, are checked further by an executive committee.

"Annual salary reviews amount to almost a religion at Pfizer, have been in effect 25 years or more.

"My reaction to a request for a raise based on a 'better offer' from another company is simply this: 'If you can get a better job elsewhere, son, go ahead; we don't want to stand in your way.' We would probably look the man over closely to see whether his attainments have been covered by the annual reviews.

Story begins on p. 79

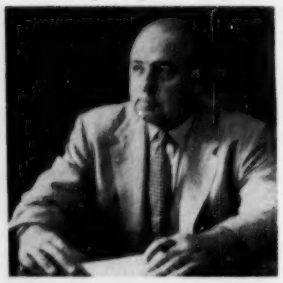
whom we would very much like to keep, this procedure is followed.

"If there is, in the employee's opinion, a real salary inequity involved, we investigate. And if he's right, he'll get a raise at the next raise period. (Colgate salaries are reviewed once each year for each employee.) We never make promises of a promotion or raise if there is no intention of quickly following through.

"It's important to remember that no matter how good the man is, he can only make as much money as the ceiling for his job will allow. You can't, for example, be a routine analyst and expect to get $15,000/year. Unless a man can qualify for a better job, all he can anticipate are nominal "loyalty" raises and any companywide raises that may come about.

"We steer clear," says Fox, "of anniversary raises (except the first) and periodic raises (e.g., on Jan. 1) to preclude the individual's expecting a raise at a given time—and being unhappy if it doesn't materialize.

"It's also true that after from 7 to 9 years with the company, a man will have pretty well proved his worth, and salaries of the newcomers should have little or no effect on his earnings. The longer he's with the firm, the less difference starting salaries will mean to him. Newcomers may get to their salary ceiling faster than their predecessors, but in the long run, it evens out."



But in 99% of cases, he would fall into the prescribed salary bracket for his job.

"We would not arbitrarily raise him out of this bracket. It's not hard to see what would happen if we did give in to such demands. It would throw the entire salary structure out of alignment and promote dissension among the rest of the research staff."

Other researchers might well say: 'We've been here just as long, etc.; how come we don't get a raise?"

"In deciding raises, I lean toward the man who can work with the team. Many of our problems require the cooperation of chemists, pharmacists, bacteriologists, medical doctors, etc., and the team worker is essential. Naturally, however, salary prospects are always good for a man who can make big contributions on his own.

"It is true that after about 7 or 9 years with the company, we know a man's capabilities, and the man knows what his future is with the company.

"One thing to remember is that a man may have been working on impossible problems, but he must be rewarded each year on the basis of performance, teamwork, and on the ingenuity and scientific skill he has displayed. The same man and a new problem may very well prove a profitable combination the next time around."

What other research executives are saying.*

Clyde Williams, Battelle Memorial Institute

"If you provide an atmosphere of satisfaction and give frequent merit raises, you will have a contented staff and they won't run off to other companies . . .

"We have two procedures: If a man is better fitted for the new job than he is for the job he holds with us, we encourage him to leave. Or, if he merits it, we try to meet it (higher offer) with increased salary."

Harrison Blankmeyer, Owens-Corning Fiberglas

"We ask him, taking an offensive rather than a defensive stand, 'You have a job now, and you're shooting for another one like it. Please tell us why you think your work justifies that' . . . You'd be surprised at the number of men who reverse those premature decisions and stay with us and turn out to do an awfully good job."

* Culled from newly published proceedings of New York University's eighth annual conference on the administration of research. Available from the New York University Press ($4/copy), the 108-page volume embodies the thinking of research management in government, industry and education on such topics as: who gets a merit raise; basic research in an applied research laboratory; communications problems in a research operation; physical facilities for research; management in the research laboratory.

Order now!

Ethanolamines
for industry

by NITROGEN DIVISION

. . . the name to watch in the petrochemicals field

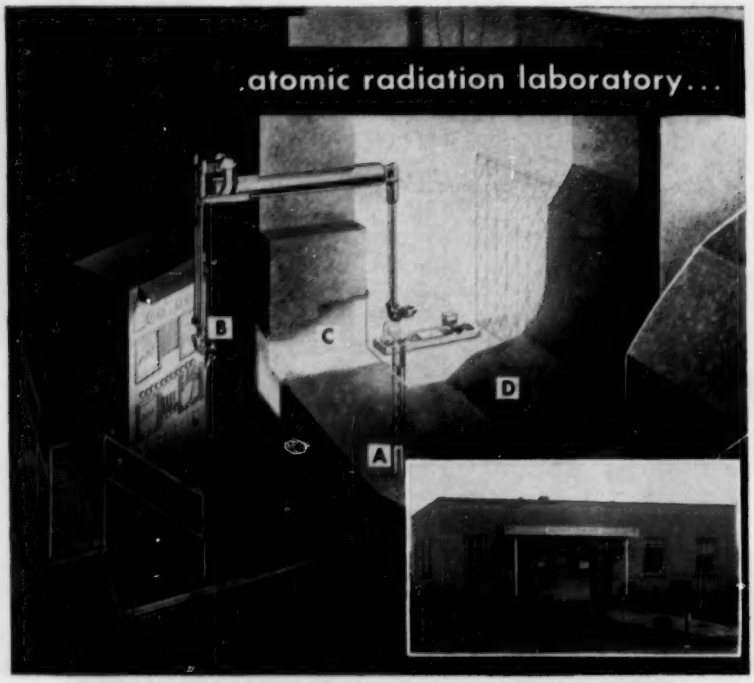
Mono-, Di- and Tri-Ethanolamines are now being produced by Nitrogen Division in its spotless new Orange, Texas, plant. You can get Ethanolamines pure enough to meet each and every one of your process needs!

Call or write today for information, quotations, and technical assistance.

Order today for prompt delivery to any location.

NITROGEN DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
Hopewell, Va. • Ironton, Ohio • Orange, Tex. • Omaha, Neb.

Anhydrous Ammonia • Ammonia Liquor • Urea
Ammonium Sulfate • Sodium Nitrate • Formaldehyde
Ethanolamines • Nitrogen Tetroxide • Ethylene Oxide
Ethylene Glycols • Methanol • Nitrogen Solutions
U.F. Concentrate–85 • Fertilizers & Feed Supplements



Test Chamber of Laboratory. Standing outside, technicians safely expose petroleum materials to radioactive cobalt (A) by operating mechanical hands (B). They view experiments through lead glass window 3 feet thick (C). Walls (D) and roof are 4 feet thick. Laboratory was built at Linden, N. J., for Esso Research and Engineering Company, subsidiary of Standard Oil (New Jersey).

first of its magnitude in oil industry... designed and built by Ferguson

Ferguson's extensive experience in the petroleum and atomic energy fields was of particular value in building and equipping Esso Research and Engineering Company's atomic radiation laboratory. The first of its magnitude in the oil industry, the laboratory is being used mainly to discover better ways of making petroleum products.

In designing and building the laboratory and installing its intricate equipment, Ferguson called upon knowledge gained in producing Brookhaven National Laboratory—the first facility for non-military applications of atomic energy.

In like manner, Ferguson's greater know-how can bring you a bigger return for your expansion dollar. Ask us to demonstrate Ferguson's *one-contract, one-responsibility* service.

Write for your copy of LABORATORIES, which describes Ferguson achievements in designing and building research laboratories for industry

THE H·K·FERGUSON COMPANY ENGINEERS AND BUILDERS

EXECUTIVE OFFICES: Ferguson Bldg., Cleveland, Phone TOwer 1-6400 • NEW YORK: 19 Rector St. CHICAGO: 1 N. LaSalle Bldg. • LOS ANGELES: 411 West 5th St. • CINCINNATI: Cooper and Wyoming Avenues • SAN FRANCISCO: 55 New Montgomery St.

RESEARCH . . . . .

Methylstyrene Boost

The future for methylstyrene, new monomer of Dow and American Cyanamid, began taking tangible shape last week at the 128th national meeting of the American Chemical Society, Minneapolis, Minn. There, Cyanamid researcher James Melchore disclosed results of tests made on methylstyrene-derived plastics.

These studies reportedly show methylstyrene plastic to strongly resemble polystyrene, but with significant differences: greater resistance to impact and high-temperature distortion.

Articles of methylstyrene are said to have kept their shape after 2½ hours in boiling water, whereas styrene is almost immediately distorted by this treatment. By the same token, methylstyrene-acrylonitrile plastics are claimed to possess better heat resistance than corresponding styrene-acrylonitrile materials.

Other spots in which methylstyrene is said to stand in for styrene, to better advantage, are: GR-S synthetic-rubber formulations; latex and styrenated alkyd paints; and paper, textile, and polyester-resin applications.

On the strength of Melchore's evaluation studies, the promising monomer is likely to be giving styrene competition in all uses that can bear a moderate cost increment. Cost of methylstyrene, however, may well be reduced when Cyanamid's diarylethane process (*CW, Oct. 24, '53, p. 41*) has hit its full stride.

Fabrication, at any rate, does not appear to be a drawback to the new monomer's commercial progress. According to Melchore, polymethylstyrene has given satisfactory results in common injection molding presses employing the usual types of mold gating. Molding conditions however, are somewhat different from those used with polystyrene.

From a research standpoint, the rising star of methylstyrene may have additional significance. It may cause a proportional reduction in studies aimed at modifying straight polystyrene to bolster the later's familiar weak points (e.g., brittleness, crazing, poor heat resistance).

How effectively it accomplishes this result, however, will depend on its success in garnering a following among molders.

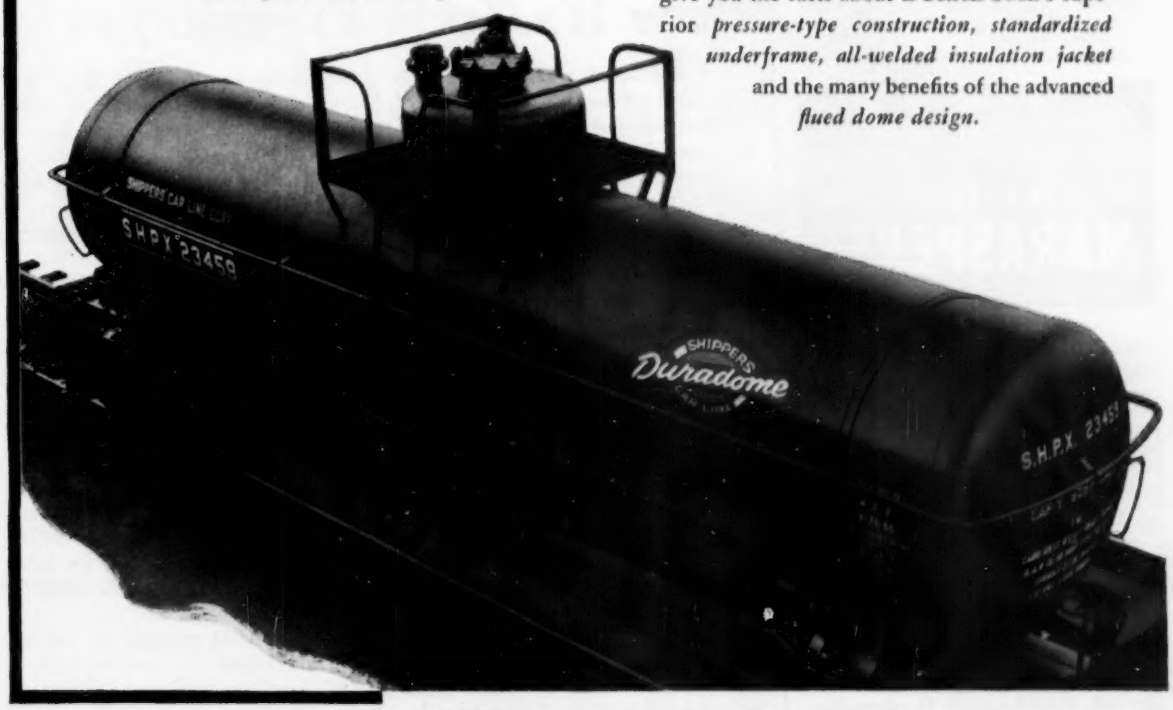
FOR GREATER TANK CAR VALUE—

Switch to DURADOME!

When you switch to the revolutionary new DURADOME tank car . . . designed and built by ACF — you get these important benefits at *no extra cost!*

1. Much easier cleaning
2. Far greater structural strength
3. Better application of lining
4. Increased insulating efficiency

Whatever your tank car requirements are — contact your Shippers' representative about leasing or buying the new DURADOME. He'll give you the facts about DURADOME's superior *pressure-type construction, standardized underframe, all-welded insulation jacket* and the many benefits of the advanced *flued dome design.*



Specialists for over 35 years in the leasing, operation, maintenance and servicing of tank car fleets — also exclusive sales agent of ACF tank cars for industry.

SHIPPERS CAR LINE SHPX

Shippers' Car Line Corporation

A subsidiary of ACF INDUSTRIES, Incorporated

30 Church Street, New York 7, N. Y.

CHICAGO, ILL. • HOUSTON, TEX. • SAN FRANCISCO, CAL. • MILTON, PA. • EAST ST. LOUIS, ILL. • SMACKOVER, ARK. • TULSA, OKLA. • NORTH KANSAS CITY, MO.

CHANGE A SEMI-SOLID INTO A FREE-FLOWING LIQUID WITH AS LITTLE AS .05%

MARASPERSE

THE LOW COST, HIGHLY EFFECTIVE DISPERSANT

With the addition of only .05% to 3.0% of MARASPERSE (based on weight of solids), from 35% to over 300% MORE SOLIDS MAY BE DISPERSED and maintained in fluid suspension . . . more effectively and more economically. Marasperse is completely soluble in water; non-hygroscopic, non-fermenting, non-caking, free flowing powder. Marasperse products are used in such applications as: Industrial cleaners, dyestuffs, ore flotation, building construction, ceramic mixes, oil well drilling, insecticide and pesticide formulations, carbon black and clay dispersions and many others.

Send coupon below for additional information on Marasperse products.

MARATHON *Corporation*
CHEMICAL SALES DEPARTMENT
ROTHSCHILD WISCONSIN

Send information on MARASPERSE DISPERSANTS. File No. W-120, to:

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

BELL

ZONE PURIFICATION: It started as zone melting . . .

Now It's Zone Freezing

An eight-month, $12,000 research contract between the U.S. Dept. of Interior and Battelle Memorial Institute catapulted zone refining back into the spotlight this week. Last heard of in conjunction with germanium-purification studies *(CW, Mar. 13, '54, p. 82)*, **the method will be applied by Battelle researchers to the extraction of fresh water from the sea.**

The goal is twofold:

- To evaluate zone purification as a means of removing salt from sea water.
- To determine whether engineering development of the technique for this use should be undertaken by the government.

But this time, it's zone freezing rather than zone melting that researchers will be investigating. The idea, simply, is that a frozen zone traveling along a column of sea water sweeps salts ahead of it to the end of the column.* Water reformed from melted ice behind the frozen zone is, if theory holds up, pure enough for drinking and irrigation.

To be conducted under Interior's saline water conversion program, the zone-refining study holds the promise of yielding a more economical method than distillation for salt-water purification. That's because it requires less energy, pound for pound, to convert water (at 0 C) into ice than it does to make steam (of water at 100 C). And since most natural salt-water sources are closer to the freezing point than to the boiling point, less energy is needed to get the water down to the freezing point.

Success of zone freezing will be measured by the same cost yardstick as applied to the product of all water-purification studies: $125/acre-foot or 38¢/1,000 gals. of fresh water for municipal and industrial use; $40/acre-foot or 12¢/1,000 gals. for irrigation. These are figured by Interior to be maximum costs.

Right now, 20 projects are active under the saline water conversion program. Total cost: about $350,000/year, with the figure expected to jump to about $700,000 next year. Methods under investigation run the gamut from solvent extraction to electric membrane processes *(CW, June 12, '54, p. 38)*.

The latter, states Interior, thus far has come closest to meeting the irrigation cost level. A six-month test of

* Zone melting usually refers to a metallurgical process in which a molten zone is moved across a bar of metal. Because impurities have different solubilities in solid and molten metal, the method is able to concentrate them at each end after the molten zone has traveled the length of the bar.

"When we need phenol, we buy it from Dow, naturally"

. . . And there's good reason for this attitude among the many users of Dow phenol. Because Dow customers consider the prompt delivery of that tank car only a small part of the transaction.

Before the actual product ever left the Dow Plant, they may have received Dow technical assistance on the best use of phenol in their production—may have even developed their final product with the help of Dow technical literature and staff assistance.

Next, their operating personnel were briefed on proper unloading procedure, using instructional material supplied by Dow.

Only then does the tank car of Dow phenol enter the picture. And the quality of product received is always dependable—constant quality-control checks by Dow make sure of that.

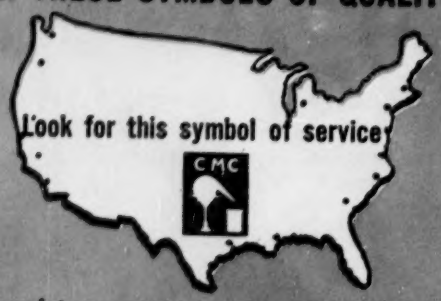
Dow's long acquaintance with phenol, which began in 1915, continues today with this company operating as one of the world's major producers of phenol. This is your assurance of dependable year in and year out supply.

A great deal of useful information about the properties, uses and handling of phenol has been collected in a booklet by Dow. You can obtain a copy by simply writing to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 801B-1.

you can depend on DOW CHEMICALS DOW

FOR THESE SYMBOLS OF QUALITY

STOCK POINTS
Seattle
Portland
Sacramento
San Francisco
Fresno
Los Angeles
Houston
Dallas



STOCK POINTS
Boston
Detroit
New York
Philadelphia
Chicago
Baltimore
Norfolk
Savannah
New Orleans

These stock points are your assurance of quality materials . . .
When you want them . . . where you want them . . .

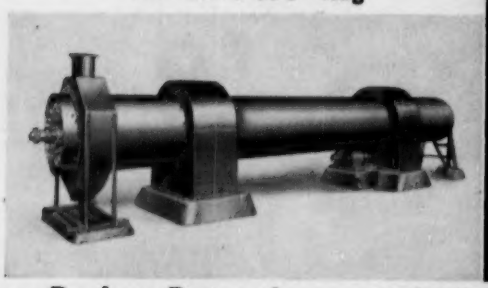
TRICHLORETHYLENE
SODIUM BICARBONATE
USP & Technical
Sodium Cyanide
Potassium Cyanide
Sodium Aluminate Dry
Calcium Formate

UREA TECHNICAL 46%
ALUMINUM SULPHATE 17%
Iron Free
Ammonium Bicarbonate
Ammonium Chloride
Ammonium Alum
Bleaching Powder Tropical 35-37%

LCL quantities available from Distributor Stocks in your area
This is only a partial listing of the items we offer. Write for complete product listings.

Chemical Manufacturing Co., Inc.
444 MADISON AVE., NEW YORK 22, N. Y.
LOS ANGELES SAN FRANCISCO
Imperial Chemical Industries Limited — Peter Spence & Sons Limited

DAVENPORT ROTARY STEAM TUBE DRYER
3'6" dia. x 30'0" long



DAVENPORT
PRESSING – DRYING and COOLING Equipment
Continuous DeWatering Presses
ROTARY DRYERS
Steam Tube, Hot Air and Direct Fire
Atmospheric DRUM DRYERS
ROTARY COOLERS
Water and Air

Drying Potassium and Sodium Perchlorate

To eliminate all possibility of explosion in drying such materials, "Davenport" Steam Tube Dryers are engineered with the utmost care.

Notice the sealed casing over the trunions which are purged with air to protect against sparking.

Let our engineers consult with you on your Pressing, Drying, and Cooling problems. Send for complete Catalog B, or for quick reference, consult your *Chemical Engineering Catalog*, 1954 or 1955.

davenport MACHINE and FOUNDRY COMPANY
DAVENPORT, IOWA U. S. A.

the process was recently completed in Arizona, and further evaluation is now under way in South Dakota. Substantial economic data is anticipated by the first of the year.

Also coming up for signature, about the beginning of next month, is a $150,000 contract for a prototype vapor - compression - distillation pilot plant. Details of this agreement are being withheld by the department until the contract is signed.

Compared with compression distillation and other well-researched techniques, zone freezing is very new to the rough and tumble of saline conversion. Whether it can thrive outside the metallurgy laboratory should be known by next spring.

•

Foreign Activity: Three recent developments highlight Japanese pharmaceutical research activity:

• Staffers of Tokyo's Pharmacological Research Foundation synthesized the N-oxides of numerous nitrogen mustard compounds, screened them against sarcoma cancer. Results are said to indicate that the N-oxide group significantly enhances therapeutic activity, increases solubility of the parent substances in water.

• At the University of Tokyo, researchers prepared a series of substituted hydroxycoumarins in an effort to find better antibacterial substances; 3-carbamyl-4-hydroxycoumarin and 3-phenylcarbamyl - 4 - hydroxycoumarin proved active in relatively high dilution against a number of test organisms.

• Discovery of new antivirus substances is highlighted in the work of Keio-Gijuku University (Tokyo) probers. The sodium salts of 3-*p*-octyl-derivatives of 3-alkylphenylazo-4-hydroxy-naphthalenesulfonic acid were found to be active against test viruses.

•

Future in Color: Methyl tetrahydrobenzothiazole, patented by Leslie Brooker and Frank White of Eastman Kodak, is pointed up in recent studies by chemists of Remington Rand. According to Rand's Robert Sprague, the compound is one of the bases that may be used to produce cyanine photographic dyes that render emulsions sensitive to red, green and blue light. Sprague reports that new cyanines, prepared from methyl tetrahydrobenzothiazole relatives, minimize a traditional handicap of this family—

Corrosioneering News

Quick facts about the services and equipment Pfaudler offers to help you reduce corrosion and processing cost.

Published by The Pfaudler Co., Rochester, N.Y.

These "extras" pay big dividends for Pfaudler customers

Besides bringing you the benefits of over 70 years' experience in the process equipment business, Pfaudler provides a number of extra activities to help increase the industry's knowledge of corrosioneering as a whole.

CORROSION FORUMS, held several times a year, provide a three-day conference on latest developments in processing equipment. Hosted by Pfaudler, the meetings spark a lively interchange of ideas among processing men.

MAINTENANCE CLASSES teach Pfaudler customer operating personnel the proper methods of upkeep for all types of equipment, helping to reduce maintenance time and costs.

RESEARCH LABORATORY keeps its doors open to everyone with corrosion problems. This may include pretesting your product in a laboratory model of a Pfaudler Unit, such as the new conical glassed steel dryer blender. Or it may mean sending you sample buttons of glassed steel for testing with your own product at your plant. Pfaudler research people are also frequently called upon to speak or write for the benefit of the chemical industries at large.

We mention these extras – only a small percentage of all the activities at Pfaudler – to point out that, while we pay our rent with the money we earn by building equipment, we devote a great deal of effort to study and research – making every effort to provide you with the most advanced developments in design, corrosion resistance and durability.

Corrosion Forums at Rochester provide liberal exchange of operating ideas plus a quick look at the future.

How to stop contamination when processing sticky products

A good example of a clinging product is polyvinyl chloride. It sticks to most everything. And when it forms a layer on the inside of an all-metal reactor, it creates a serious cleaning problem, because material left adhering to the walls will contaminate succeeding batches.

Another drawback often encountered in metal reactors is metallic contamination, which upsets the heat stability of the resin.

You can eliminate these two hazards with Pfaudler glassed steel polymerizers. Practically nothing sticks to their smooth inner surface. Cleaning is quick and easy.

And there is no metallic contamination. Pfaudler acid-alkali-resistant glass shrugs off attack by all acids except hydrofluoric, resists alkaline solutions up to pH 12 at 212° F. This provides a broad latitude of applications which can be served by this equipment.

Your Pfaudler representative will gladly discuss your own processing needs with you. Call him or write us.

CUTAWAY VIEW of Pfaudler Glassed Steel Reactor shows two good reasons why it can easily handle sticky products: Smooth glass surface, plus a highly efficient, rigidly supported agitator which is capable of maintaining thick, heavy suspensions.

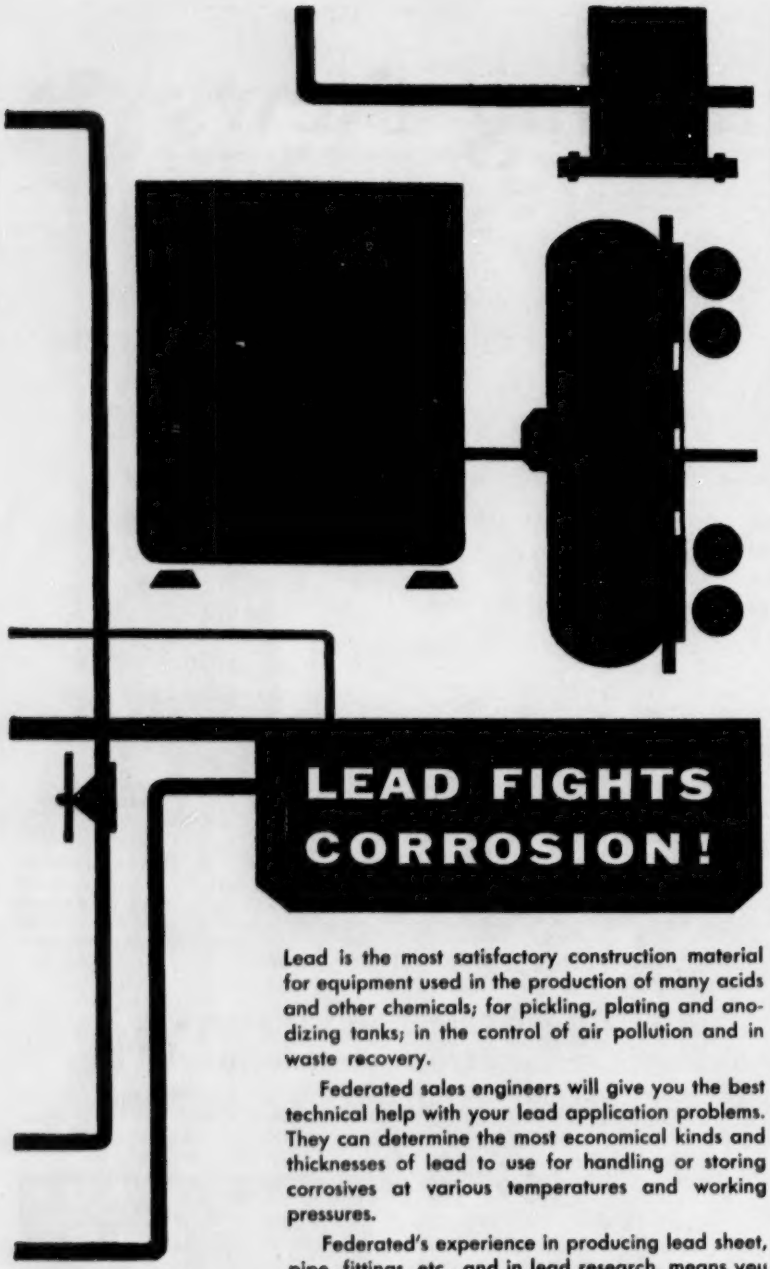
Glassed steel polymerizers improve heat transfer at General Tire

These Pfaudler Reactors at General Tire and Rubber Co., Ashtabula, Ohio, process HCl with PVC, at pressures as high as 200 psi. Once started, this reaction becomes very exothermic, and accurate temperature control becomes a vital necessity. Because glass reduces filming on the reactor walls, closely controlled heat transfer is easily accomplished with minimum impedance.

Another important problem is protecting the product from contamination by lubricants, metal, or product which has remained from earlier batches. The corrosion resistance of Pfaudler Glassed Steel prevents metallic contamination and the smooth, nonadhering surface prevents accumulation of product.

These reactors are 3500-gallon units. Since ten of them were put into service in October 1954, the records show that they have maintained a very high level of product purity and quality, with regard to particle size and temperature of processing. Write or call your Pfaudler representative for further details on the results possible with the remarkable corrosion resistance of glass plus the working strength of steel.

These glassed steel polymerizers protect the purity of PVC at General Tire.



Lead is the most satisfactory construction material for equipment used in the production of many acids and other chemicals; for pickling, plating and anodizing tanks; in the control of air pollution and in waste recovery.

Federated sales engineers will give you the best technical help with your lead application problems. They can determine the most economical kinds and thicknesses of lead to use for handling or storing corrosives at various temperatures and working pressures.

Federated's experience in producing lead sheet, pipe, fittings, etc., and in lead research, means you will get a product as good as any available; we believe much better!

For any information on the use of lead and lead products, write to Federated's Corrosion Advisory Service at the address below or at any of Federated's 13 plants and 23 sales offices across the nation. Or send for Bulletin No. 162, Lead Handbook for the Chemical Process Industries.

Federated first in the non-ferrous field

FMD

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
In Canada: Federated Metals Canada, Ltd., Toronto and Montreal
Aluminum, Magnesium, Babbitts, Brass, Bronze, Anodes, Zinc Dust, Die Casting Metals, Lead and Lead Products, Solders, Type Metals

RESEARCH. . . . . .

i.e., the tendency to stain photographic emulsions.

•

Separator: Carbide and Carbon Chemicals researchers at Oak Ridge, Tenn., have come up with data substantiating the usefulness of perfluorocarboxylic acids as extracting and separating agents for cations in water solution. Their work reportedly indicates that trivalent cations (Fe, Al, Cr) and a few divalent cations (Be) are effectively separated from monovalent cations (and other divalent cations) by perfluorobutyric acid. These divalents —Ca, Mg, Fe, Pb and Zn—may be separated from monovalent cations with perfluoroöctanoic acid.

•

In Step: Newest arrival on the radiation research bandwagon is Gulf Oil. The company intends to construct a nuclear science laboratory at its Harmarville, Pa., research center. Principal unit of equipment in the proposed facilities will be a giant 3-million-volt atom smasher now under construction by High Voltage Engineering Corp. (Cambridge, Mass.). A Van de Graaff particle accelerator, the machine is capable of producing virtually all fundamental forms of radiation.

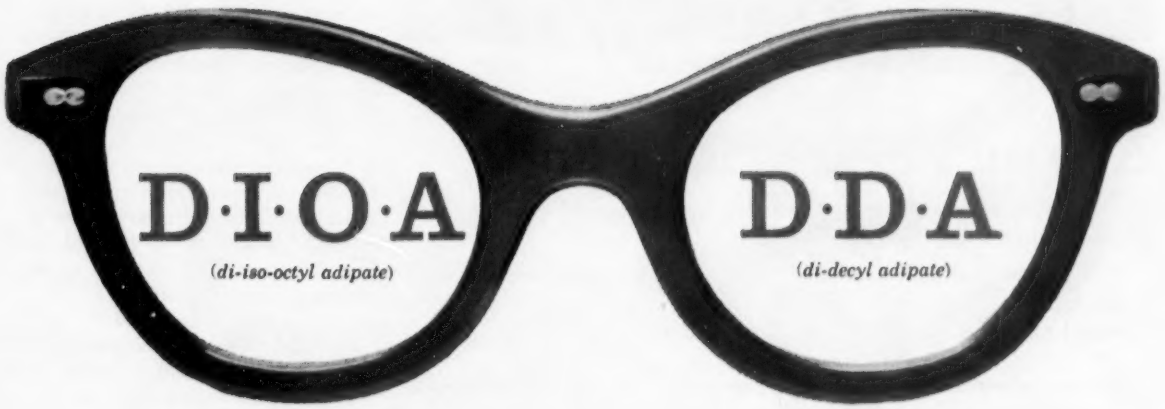
•

Data Speedup: A recently concluded agreement between Dept. of Commerce and Atomic Energy Commission is intended to accelerate the publication of nonclassified AEC research reports of potential industrial value. In the first move of this effort, 961 selected reports were released recently through Commerce's Office of Technical Services.

• Also new from Office of Technical Services is a survey of literature in the field of radiation sterilization. The offering comprises four research reports prepared by the Quartermaster Food and Container Institute.

•

Barnyard Gain: Cattle may soon be getting antibiotics in their rations, if research at Chas. Pfizer bears fruit. According to Pfizer probers, a minute amount of antibiotic enabled cattle at the firm's Terre Haute, Ind., research farm to gain weight on less feed than they ordinarily required. Antibiotic used in the tests: Terramycin. The newly reported results parallel those first obtained (several years ago) in feeding test quantities of antibiotics to poultry and hogs.



Look to ENJAY for better iso-octyl and decyl alcohols for better plasticizers

Sebacates... Phthalates... Azelates... Adipates

All of these high-quality, uniform plasticizers were originally developed from Enjay iso-octyl and decyl alcohols and are conveniently available under the brands of leading plasticizer manufacturers.

More and more—superior plastics are being made with these effective and economical plasticizers.

Be sure of dependable high quality—ask *your supplier* for these plasticizers made from Enjay Alcohols. Enjay and its affiliates do not manufacture plasticizers.

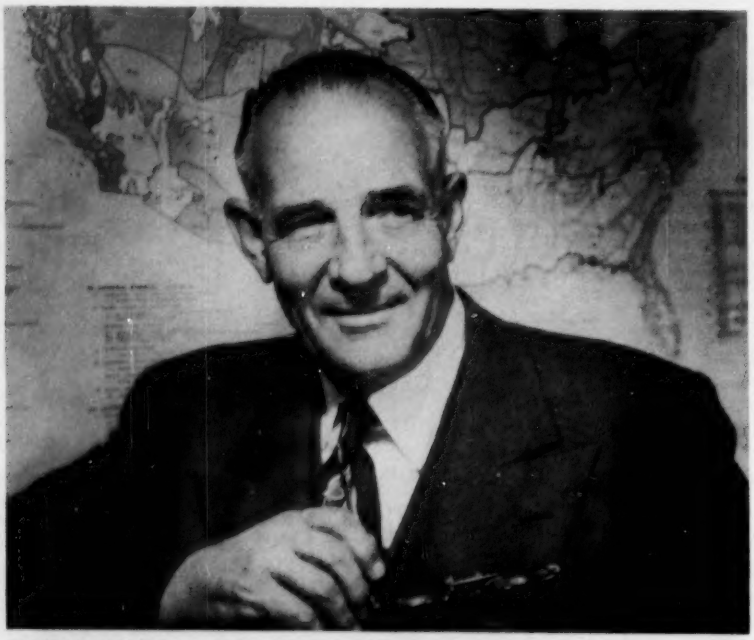
ENJAY

35 successful years
of leadership
in serving industry

ENJAY COMPANY, INC.

15 West 51st Street,
New York 19, N. Y.

ENJAY IS THE PIONEER AND THE WORLD'S LARGEST SUPPLIER OF ALCOHOLS BY THE OXO PROCESS



NACA'S MOHR: Safety's a moral responsibility, too.

Eye on Future Harvests

Farm chemical makers size up the markets ahead for their products. Outlook: encouraging.

But part and parcel of the approach to tomorrow's sales is an increasing concern with making, selling, and using agricultural chemicals safely.

Take any group of men concerned with farming, and you're sure to hear talk of weather, insects, harvests, and hopes for the future. Makers of agricultural chemicals are no exception, and when they gathered at Spring Lake, N. J., last fortnight for the 22nd annual meeting of the National Agricultural Chemicals Assn., there was special emphasis on the future.

The increasing demands that will be made on the farmer for foodstuffs and fibers and the decreasing number of hands doing farm work have helped insure a permanent role for farm chemicals. The job ahead lies in finding new phases of agriculture that can benefit from chemicals, and in demonstrating how more can be used where they have already made a start.

Help Wanted: Lea Hitchner, executive secretary for the organization, showed several areas where there's room for future growth (and with pesticide sales good this year, firms were not so preoccupied with problems of the present that they couldn't appreciate suggestions for the future):

- There's a giant market for chemotherapeutants—chemicals to cure plant diseases. Insects—they still extract a toll from harvests, but most of them could be controlled with chemicals—are one problem; virus, bacteria, and fungus are as costly, if not more so, and countermeasures are being worked out only slowly.
- With the U.S. Dept. of Agriculture and the Food and Drug Administration putting extra emphasis lately on clean grain, there has developed a sizable market for products to eliminate the rats and insects that produce filth. It's not a startlingly new market area, but it will become large only with the firm prodding that governmental agencies can give.
- An expanded highway building program has created a need for herbicides to control weeds along the rights-of-way.
- Insect and disease losses to timber—a field that received considerable NACA attention a couple of years ago—could be reduced by chemicals; the need is great enough to provide an important outlet for pesticides.

Plus Two: While primarily emphasizing the researchers' role in farm chemicals, Jack Thurston of American Cyanamid added some other areas for future sales development (Thurston pointed them out as areas where the researcher's help is needed, rather than as sales areas) to the preceding four:

- Chemicals that control pests and parasites on meat-producing animals are needed. A start has been made, but there's plenty of work ahead.
- There are further requirements for systemic pesticides—chemicals that can render the plant "insectproof."

Safety Sense: Art Mohr, retiring from his position on the NACA Board of Governors,* hit hard on the theme of safety. As a manufacturing industry, agricultural chemical makers have an excellent record—the big concern lies in getting the public in general to use necessary chemicals safely.

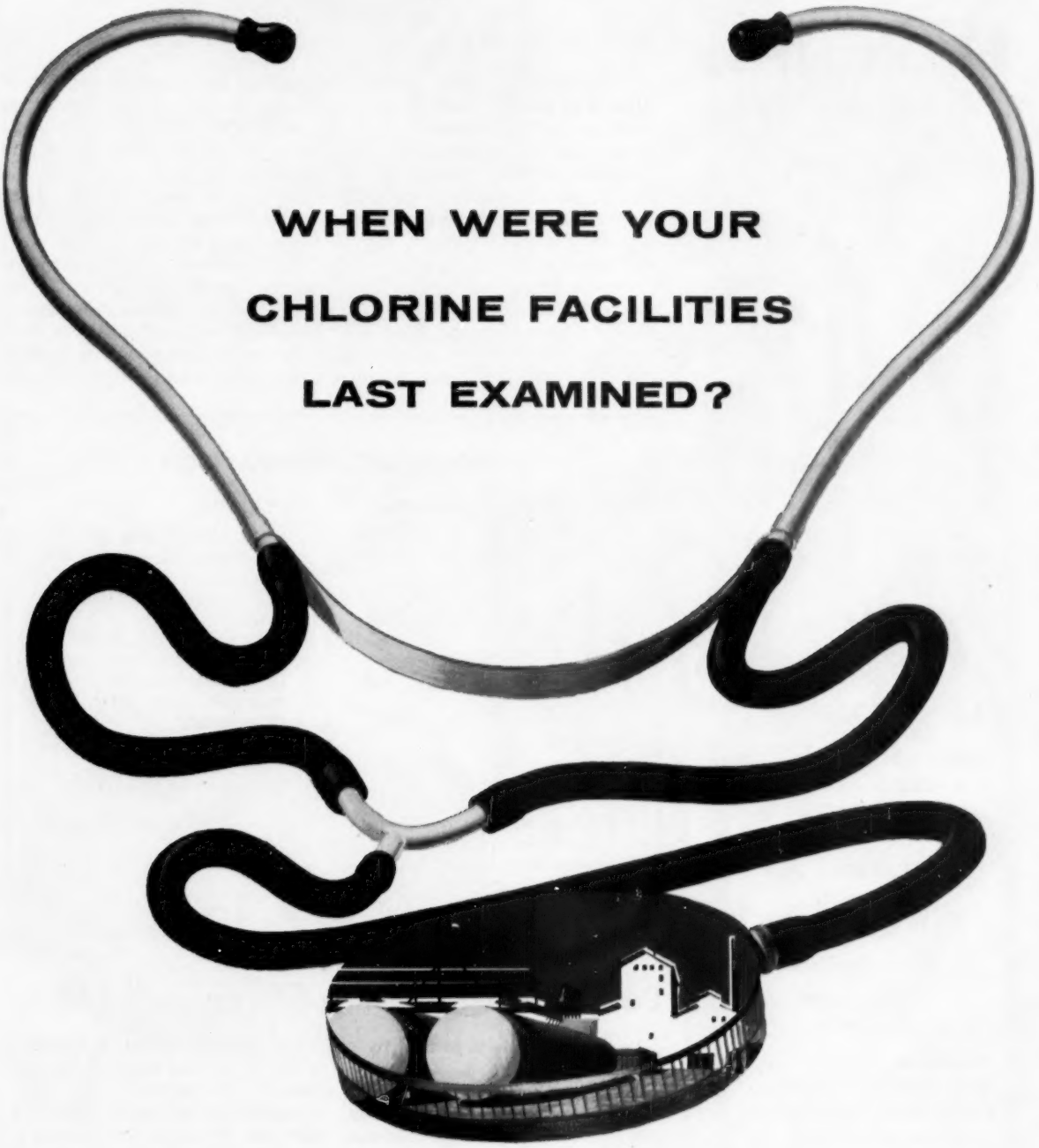
Pointing out the danger of bad publicity and of financial liability, Mohr emphasized the industry's moral responsibility, a responsibility that is bound to increase. He suggested a two-part program, one part for industry (applying to directions and instructions for its own products)† and the other for the NACA, as an association. Three points of his NACA plan:

- Get universities, extension services farm advisors and the like to underscore safety ideas in all their literature and recommendations.
- Work with the National Safety Council on teaching safety.
- Ensure that the entire NACA membership—and any others—co-

* Three new members were added to the NACA Board of Governors: James Hopkins (Hopkins Agricultural Chemical Co., Madison, Wisc.); William Liipfert (Woolfolk Chemical Works, Fort Valley, Ga.; Loren Scoville (Diamond Alkali Co., Cleveland). They will serve a five-year term, with their first duties coming up at the NACA spring meeting slated for the Hollywood Beach Hotel, Hollywood, Fla., March 14-18.

† The program is similar to the one his own firm (California Spray Chemical) has now *(CW, Oct. 30, p. 86).*

WHEN WERE YOUR CHLORINE FACILITIES LAST EXAMINED?



It is a wise policy to have your chlorine equipment and facilities examined every year by a Columbia-Southern engineer.

Our Technical Staff will review this phase of your operation for efficiency and safety. They will consult with any of your employees on the proper methods of handling and unloading chlorine and review safety practices and first aid measures.

This is one of the many services Columbia-Southern renders to Chlorine users. Contact any of our offices today.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago
Cleveland • Boston • New York • St. Louis • Minneapolis
New Orleans • Dallas • Houston • Pittsburgh • Philadelphia
San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

HARCHEM SEBACIC ACID IS A PURE CHEMICAL

THE KEY TO HARCHEM SEBACIC HEAT AND LIGHT STABILITY

HARCHEM SEBACIC ACID is a PURE chemical suitable for your most exacting developments.

OUTSTANDING FOR

High Temperature Stability

Built-in Flexibility

Maximum Light Resistance

so essential to Alkyds, Polyesters, Polyamides, Plasticizers, Synthetic Lubricants and production of your other high quality products.

THE KEY TO HARCHEM BETTER PLASTICS

PLASTICIZERS

HARCHEM DIVISION
WALLACE & TIERNAN INC.
25 MAIN ST. BELLEVILLE 9, N. J.

operate with the over-all program.

Look at the Law: Safety was, of course, a major concern in the formulation of the Miller Amendment. This regulation, although backed by the NACA, still baffles many of the member firms. A final-day panel of university and federal officials, to discuss the regulation, drew heavy attendance.

Though administration of the act is supposed to be self-supporting, Winton Rankin, representing the Food and and Drug Administration, pointed out that, so far, collected fees have scarcely paid half the expenses. The task of putting the new law into effect has been loaded with complications, and things have been moving slower than expected.

A question period after the panel covered a wide area where apparent confusions exist—e.g., precise meaning of zero tolerance; the use of pesticides on forage crops and cattle; the possibilities of tolerance cancellations, etc. The NACA will provide a complete list of questions and detailed answers to interested members later on.

PROCESSING COMPARISON

Conventional Porcelainizing

1. Alkali clean
2. Hot water rinse
3. Alkali clean
4. Hot water rinse
5. 2% Sodium hydroxide flush
6. Hot water rinse
7. Sulfuric acid pickle —8%— 8 min. at 150 F
8. Cold water rinse
9. Nickel flash, 5 min. at 150 F
10. Cold water rinse
11. Sodium cyanide neutralizer, 1½ min. at 150 F
12. Hot water rinse
13. Oven dryoff
14. Ground coat application
15. Ground coat firing
16. Cover coat application
17. Cover coat firing

Pre-Nameling

1. Alkali clean, 5 min. at 190 F
2. Alkali clean, 5 min. at 190 F
3. Hot water rinse, 30 sec., 160 F
4. Pre-Namel pickle, 5 min. at 170 F
5. Cold water rinse, 30 sec.
6. Pre-Namel 410, 1 min. at 160 F
7. Cold water rinse, 30 sec.
8. Spray deionized water, 30 sec.
9. Oven dryoff
10. Prefire, about 1400-1450 F, 3 min.
11. Cover coat application
12. Cover coat firing

Porcelainizing Step Saver

To eliminate a step in porcelainizing steel to save 30% in application costs is a worthwhile achievement in itself. To do so, and also come up with a process that produces improved physical properties of the coating, more than doubles the value of the improvement. That is what Parker Rust Proof Co. (Detroit) believes it has done with its new Pre-Namel coating process.

A treatment that is just now being introduced to porcelainizers across the country, Pre-Nameling eliminates five operations (*see box*). To this production saving, Parker says, can be added savings resulting from use of nonpremium base metals, reduction in the number of necessary frits, and space (equipment) savings.

But even more important, according to Parker, are the improved physical characteristics of the treated metal: Separation of the coating from the metal due to twisting and bending is reduced; there is less "chipping"; and there is improved resistance to general abuse.

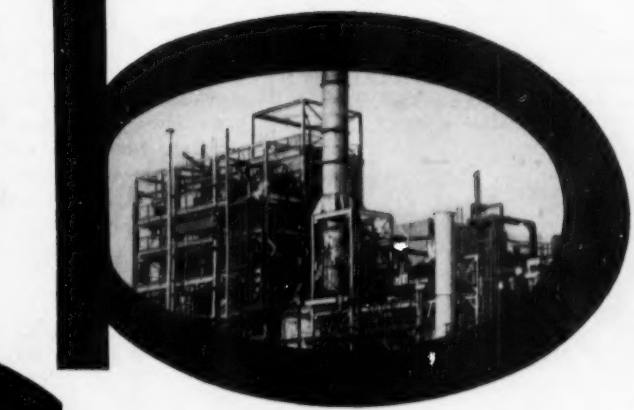
Forty-Year Hunt: Parker makes no claim of having discovered the idea of one-coat porcelainizing. That has been the objective of some 40 years' search by a number of firms, and a number of methods have been offered.

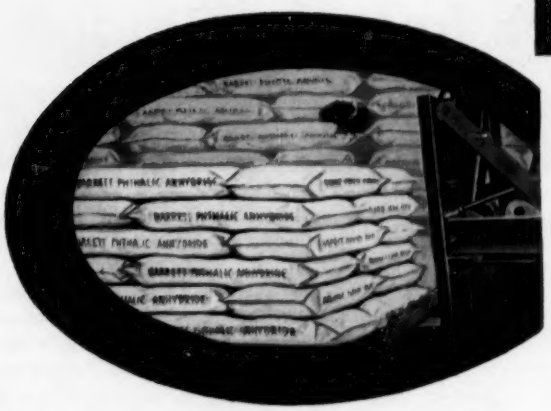
Basically, the elimination of a ground coat has been desirable because it is a time-consuming operation (actually a complete porcelainizing step in itself, it currently constitutes about 30% of the cost of coating,

availability

basic production

convenient packaging





BARRETT knows the abc's of better supply!

As a producer of Phthalic Anhydride, Barrett offers three important advantages every user of "P.A." should consider carefully. These are:

AVAILABILITY: Barrett has four large, modern plants, strategically located—one in Chicago, one in Ironton, Ohio and two in Philadelphia. These four plants provide customers with a source of supply that offers service unmatched for speed and efficiency.

BASIC PRODUCTION: Barrett is the world's largest producer of Phthalic Anhydride and the Naphthalene it is made from. This basic position permits us to exercise extraordinary control over the quality and purity of our product.

CONVENIENT PACKAGING: We offer packaging to suit the needs of the customer. Phthalic Anhydride comes flaked in 5-ply paper bags or liquid in tank cars or trucks. We will arrange unitized shipments at your request to save you handling time and costs.

BARRETT CHEMICALS

BARRETT DIVISION, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N. Y.
In Canada: The Barrett Company, Ltd., 5551 St. Hubert St., Montreal.

OVER 100 YEARS OF EXPERIENCE

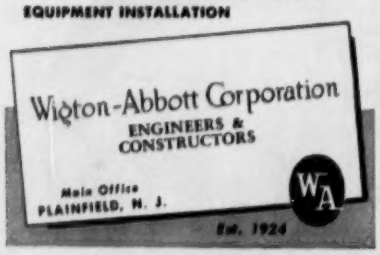
Development Center — Nitrogen Division
Allied Chemical & Dye Corporation
Hopewell, Virginia

LABORATORY SAMPLE FROM

Wigton-Abbott

RESEARCH LABORATORIES—
Designed-Engineered-Constructed to answer your needs and the competition of tomorrow.

SURVEYS, REPORTS & PROCESS DESIGN
INDUSTRIAL DESIGN & CONSTRUCTION
EQUIPMENT INSTALLATION



Recover

PERCHLOROETHYLENE

for only 2¢ per gal.

Some users of "Perchlor" pay around $1.50 a gallon for this solvent. Others recover it for re-use again and again at a cost of only 2¢ a gallon. The difference is a Barnebey-Cheney Automatic Solvent Recovery system — direct operating costs being only 1/75 as much per gallon as original cost.

If you use solvents, let us show you how to make similar savings with Automatic Solvent Recovery. Send for free Bulletin No. 821-53.

BARNEBEY-CHENEY
company
CASSADY AT EIGHTH COLUMBUS 19, OHIO

In Canada: BARNEBEY-CHENEY LTD., St. Johns, Quebec

according to Parker), which adds an extra 0.002-0.004-in. to coating thickness. Further, it must be masked by a cover coat, and is affected by variations in the base metal.

Several attempts at doing away with the ground coat employed an agent added to the frit; this worked well only with special base metals. Pre-Namel is said to have proved so effective that in some cases cold-rolled steel can be substituted for more expensive enamel-grade iron.

Durable Base: Parker won't say much about the composition of its new compound, though it has been broadly termed a phosphate treatment. In solution (at 160 F) it is a clear, watery liquid, and is applied by dip or spray after cleaning and pickling operations. Although the nickel flash, extra rinses, ground coating and firing steps are eliminated, even with Pre-Namel base metal must be prefired (a fairly critical step), which gives the base a brownish hue.

The treatment permits a finish coating—white and colored frits adhere well—of about 0.0054-in. thickness, considerably under that of two-coat porcelains. It is, however, more flexible and more resistant to "fishscaling" than the double coat. Pre-Nameling is corrosion-resistant in itself, and in many cases, it is deemed sufficient protection for the underside of table tops, inside of stove parts, etc.

Parker doesn't claim all the credit for the new development. Pemco Corp., a Baltimore porcelainizer, spurred the research on the project, and Frigidaire cooperated.

In offering the process to frit coaters, Parker has a package deal: cleaning, pickling, and Pre-Namel chemicals will be sold as a unit. Porcelain finishers represent a new outlet for Parker (long known for its phosphate prepainting treatment) as well as a new selling idea. Odds are, however, that the firm is in the business to stay—already it has an aluminum treatment, Pre-Namel 420, about ready for the market.

Pot Luck from the Garage

The recurring story of businesses that start small and build big always brings up the question: How small can you start, in terms of capital? In chemical specialties, the answer seems to be: very, very small indeed, if you replace money with enough enterprise.

That's what the two cookware salesmen, David Erkel and David Dewey, who started Kleen King Home Products (Burbank, Calif.), prove. Starting eight years ago with little more than seeing a need for a new product, they have built up to a business with annual sales of over $400,000.

The need they saw was for a specialized metal cleanser in the Los Angeles area for the growing market in stainless-steel and copper-bottom cooking equipment. As door-to-door salesmen for the Lo-Heet Co. (pots and pans), they were being constantly bothered by having to order from Detroit a metal cleanser called Steel-Bright, not available to West Coast housewives.

They offered a research chemist friend (Dr. Robert Austin) royalties on possible sales for developing a suitable product. (Formulas were kitchen-tested—says Erkel: "My wife nearly went crazy trying to use all the stuff.") Finally, a preparation that met their three-way requirement was developed: It worked, was easy to apply, was stable in powder form. (A nonpoisonous acid type, it works through a reducing action when in contact with water.)

A Shoveler and a Pitchman: A company organization was set up. Dewey, a mechanical engineer, was made chief of production (he mixed the ingredients in an old cement-mixing trough with a shovel; hand-filled the cans), and Erkel was sales manager (he gave demonstrations in department stores).

First customer was their employer, the Lo-Heet Co., followed by half a dozen cookware competitors. After five months with no customer complaints, Kleen King moved into department stores (supermarkets, the big outlet, are much harder to crack, says Erkel) through a small order from the May Co. To ensure reorders, Erkel and Dewey sent wives and friends to buy out the first lot, persuaded the May Co. to let Erkel demonstrate the product in the store. Sales were good, and Erkel was able to move the Kleen King demonstrations

From the rocks of **Les Baux**

Back in 1821, Pierre Berthier of the French Royal Corps of Mines, according to legend, was strolling in the hills around the village of Les Baux (Bouches du Rhone), France. His companion stained her white dress with material from the surrounding rocks.

Upon learning the young lady was having difficulty removing the stain, Berthier collected samples of the rocks of Les Baux. When he analyzed the ore he found it contained 52.0% alumina, 27.6% ferric oxide, and 20.4% combined water. This was the first official recognition given to the deposit. Later, the ore was named "Bauxite" from its association with the near-by village of Les Baux.

Since this discovery, other deposits of bauxite have been found in several parts of the world. In addition to being the basic raw material of the world's aluminum industry today, bauxite is also an important raw material used by the chemical industry and for the production of abrasives, refractories and ceramics.

Aluminium Limited, as producer of one-fourth of the free world's aluminum, is engaged on a world-wide scale with exploration . . . mining . . . processing . . . and the development of new uses for bauxite. The Aluminium Limited Sales, Inc. office near you will gladly supply you with information on the various grades of bauxite and its derivative chemicals.

ALCAN CHEMICALS FOR INDUSTRY

- Alumina, Activated
- Alumina, Calcined
- Alumina Hydrate
- Aluminum Chloride, Anhydrous
- Aluminum Fluoride
- Aluminum Sulphate
- Aluminum Super Purity 99.990% min. pur.
- Bauxite
- Chlorine, Liquid
- Cryolite, Artificial
- Fluorspar
- Lime
- Magnesia
- Magnesium Chloride, Anhydrous
- Sodium Fluoride
- Sulphuric Acid

ALUMINIUM LIMITED SALES, INC.

One of the **ALUMINIUM LIMITED** Group of Companies

630 Fifth Avenue, New York 20

20 North Wacker Drive, Chicago 6
422 Terminal Tower, Cleveland 13
2842 West Grand Boulevard, Detroit 2
611 Wilshire Boulevard, Los Angeles 17
Av. Ing. Luis A. Huergo 1279, Buenos Aires
Rua Da Quitanda, 96, São Paulo

ALCAN

Aluminum Chemicals

into other department stores.

Don't Call Us: The supermarket break came when the buyer for Ralphs Market (a leading California chain) called in an order. "I couldn't even get the guy on the phone for six months," says Erkel. "Finally, when I had about given up, he called me." Other chains quickly followed, and the product now has nearly 100% distribution in southern California grocery chains, big department stores, and hardware stores.

Starting with 15 tons the first year, the sales climb has been spectacular. It tripled the second year, doubled each of the next two years, rose 30% each of the next three, and is still rising at a 25% rate (1954 production was 400 tons).

Manufacturing has been moved from Dewey's garage to a 5,000 sq. ft. plant in Burbank (after an interlude in a 1,500 sq. ft. plant in Glendale), and the firm now has two mixers, a conveyor system to an overhead hopper, a Waywright volumetric filler, a semiautomatic seamer and two manufacturing employees.

Ads and Additions: People have also been hired to take over Erkel's demonstrating chores. In a broader effort, the company has been investing heavily in advertising: radio, TV, magazines, 1,000-line color newspaper ads. The company is now spending 15% of gross sales for advertising, has spent as high as 27%. Says Erkel: "I realize that is a high percentage for promotion, but I believe it is absolutely necessary for a small company to push its products heavily. I can't think of a better way for a small firm to put money back into the business."

The line has been expanded too. Under the Kleen King label is a cleanser for aluminum (both retail at 39¢/12-oz. can); under the name "Handiwood" is a powder repair material, and called Preciso is a casting material for making molds or sculptured figures. Although sales of the aluminum cleanser have been slow (it caked in the package on grocers' shelves and, although the difficulty has now been corrected, dealers are reluctant to restock), Erkel feels that in a few years it will equal sales of the stainless-steel and copper cleanser (it now accounts for about 20% of Kleen King's volume). Kleen King believes it is the only maker of a powder aluminum cleanser.

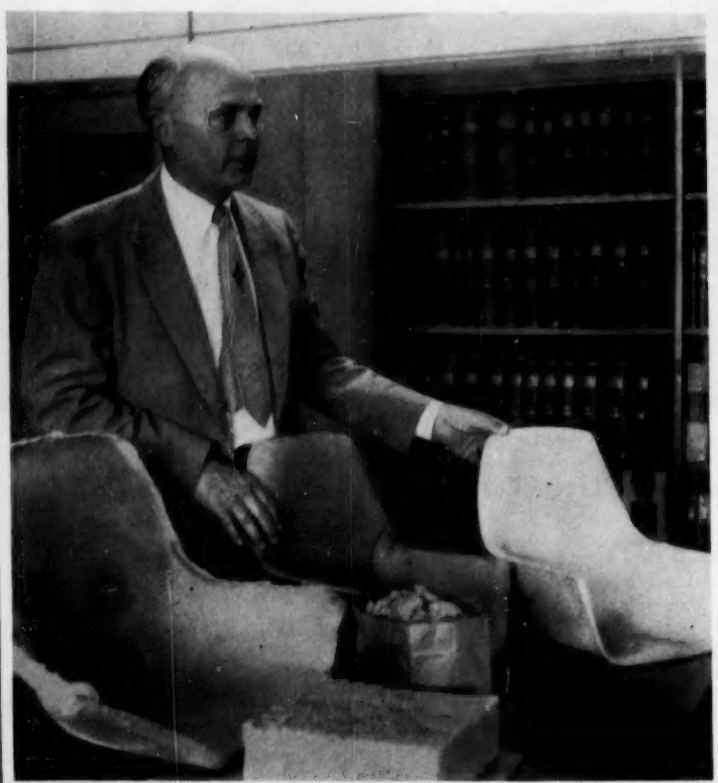
The product's market is still pretty much confined to the Western states, but the company is investigating warehouse and filling facilities in Houston and Kansas City or Chicago.

Kleen King has become of respectable size, now, but it is still pushing upward. Besides the Midwest expansion, Erkel and Dewey plan for the company to grow in other directions, too—by its moving to a twice-as-big plant and increasing the line. Scheduled for October: a still-secret new product. It's another cleanser, and Kleen King expects the trail blazing done by the aluminum and steel products to make it big.

Plastic Aerosol

The first all-plastic aerosols began filtering into drugstores last week, wrapped around Angelique & Co.'s (Wilton, Conn.) latest colognes. The new package is the product of another Connecticut firm, Colt's Manufacturing Co. (Hartford). It is a specially molded, 2-ounce melamine unit finished in white, and contains 1.74 ounces ($2.50) of the scent.

Promised momentarily since late last year, the plastic aerosols have been slow in actually hitting the market. Besides the melamine units, nylon bot-



Seat of the Problem

IN ITS SEARCH for ways to utilize sawmill waste products, the Weyerhaeuser Timber Co. (Longview, Wash.) has come up with this chair for children. Wood chips and sawdust are bonded with phenolic resin to make a block of raw material which is molded in three stages to make the seat. J. R. Roberts (*above*) of the Weyerhaeuser Development Center, which developed and test-marketed the chair, says the company is producing 110/day. They will be marketed by the Tommy Tucker Co. (Los Angeles).

● We're taking our Labs
to the Statler, New York . . .
bring your problems to booths 143-144,
1955 Paint Industries' Show, Oct. 3-5

One can do the job!

Celanese* Double Duty Pentaerythritol fits "pure" as well as "tech" grade uses

Reduce your purchase and inventory problems with Celanese Double Duty P.E. It costs no more than "technical" grade, yet it qualifies for both premium and low-cost alkyd resin applications.

Celanese P.E. is high in hydroxyl value, uniform in mono content and low in ash. It eases filtration, permits lighter colors, and saves as much as 4% on pentaerythritol requirements.

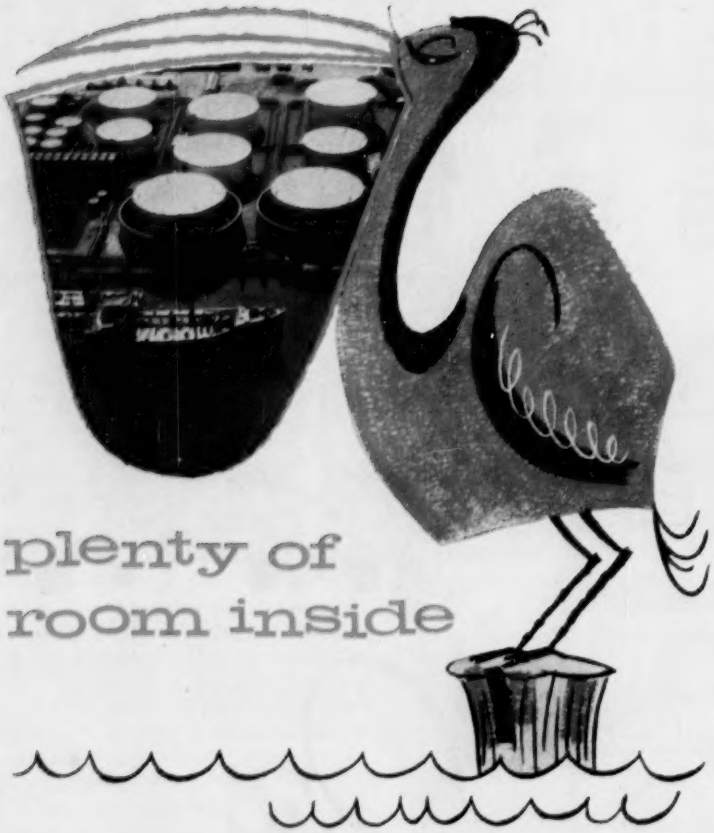
Write for the Celanese P.E. Bulletin. It's complete with test formulations and cost comparisons.

Celanese Corporation of America,
Chemical Division, Dept. 652-I
180 Madison Ave., New York 16.

*Reg. U. S. Pat. Off.

Celanese* CHEMICALS

*Reg. U.S. Pat. Off.

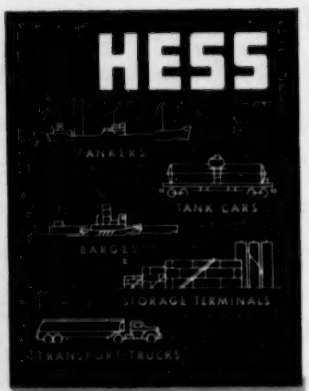


400,000,000 gallons of liquid storage capacity

If you buy, sell or use bulk liquid products, why not take advantage of the modern Hess storage terminals in New York Harbor or along the Gulf Coast. The key to more than 400,000,000 gallons of storage capacity is yours without capital investment . . . and Hess is geared to handle quantities from 10,000 to 10,000,000 gallons with complete tank and pipeline privacy.

Service when you want it—twenty four hours a day, seven days a week, plus tanker, barge, tank car, transport truck and high speed drumming facilities give you all the advantages of your own storage plant with none of the headaches.

You'll find the whole story in our new illustrated book "You can depend on HESS." Free copy on request. For fastest service, please call or write the Hess office nearest you.



HESS, INCORPORATED
Perth Amboy, N. J.
VAlley 6-1000
HESS TERMINAL CORP.
Houston, Texas
Glendale 37195

tles have been shown experimentally, and may be offered soon. But right now, Colt's has the field to itself. In addition to custom-molded packages such as the Angelique container, Colt's sells 1- and 2-ounce units of standard design.

The standard containers, complete with valve, sell within the "same range" as glass aerosol products (melamine containers don't show liquid level, like glass). This is roughly one-third more than a typical "beer can" container and valve combination. Colt's makes its own special valve, sells only the combination. Like the container, the Colt valve is all-plastic, although not melamine.

The plastic units carry an 18-20 psi. pressure. They can be either cold- or pressure-filled — for Angelique, Armstrong Laboratories (Boston) is doing the filling.

Currently, Colt's is only molding the aerosol units; decorating is done elsewhere, although the firm plans to begin that phase shortly.

•

Ohio Addition: Boyle-Midway Co., subsidiary of American Home Products Corp. (New York), has acquired Hygenic Products Co., Canton, O. Hygenic, makers of Sani-Flush and Melo, household chemicals, will be renamed the Canton Div. of Boyle-Midway, will be directed by H. E. McKown.

•

Flood Relief: A free shipment of a disinfectant concentrate, Usamine-C, has been sent to flood-ravaged Waterbury, Conn., by U.S. Sanitary Specialties Corp. The supply, large enough to make 100,000 gal. of the germ killer, will be applied to the downtown area to protect against contamination, using borrowed water trucks (Waterbury's were knocked out by the disaster).

•

Aloha, Rats: To combat rats, which cause extensive damage in Hawaiian sugar cane fields, the Hawaiian Sugar Planters' Assn. is testing the use of poison pellets. The pellets contain quick oats, white flour, fish meal, molasses, water, thallium sulfate and *p*-nitrophenol, are given a paraffin dip to make them water-resistant, and a coating of linseed oil for a baiting aroma. (Harmful to humans, the pellets are being dropped only into thick cane fields where people seldom venture.)

IT'S THE LOWER COST of the manufactured *quality* product that counts . . . not the cost of the ingredients you use. That's why Michigan Chemical's Ethyl Bromide often is an economical intermediate to employ for the introduction of the ethyl radical. When combined with another intermediate, Ethyl Bromide can result in a higher yield of finished product with overall lower costs and higher production. Try it.

SPECIFICATIONS:

Specific gravity of material at 20°C. compared to that of water at 4°C.	1.450 to 1.465
Distillation range, 5 to 95% within	3°C.
Distillation range to include	38.4°C.
Acidity	Neutral
Color	Water white and clear

Michigan Chemical Corporation, for almost twenty years a quality producer of chemicals, offers a series of pure Bromides, among them being Ethyl Bromide, Monobromobenzene, Cyclopentyl Bromide and Hydrobromic Acid, specially made for use in pharmaceuticals. Write for further information or catalog.

C 54-3

*Trademark

MICHIGAN CHEMICAL CORPORATION Saint Louis, Michigan

EASTERN SALES OFFICE: 230 Park Avenue New York 17, New York

BASIC MANUFACTURER OF INDUSTRIAL, PHARMACEUTICAL AND AGRICULTURAL CHEMICALS

Rubber recipe?

—here's a recipe that will delight you!

SLAB SOLE COMPOUND

	Parts by Weight
GR-S, 1006	90
High Styrene Resin	10
NEVILLE LX-685, 135	12
Antioxidant	1
Calcium Silicate	50
Hard Clay	200
Zinc Oxide	5
Process Oil	5
Mold Lubricant	2.5
Stearic Acid	1.5
Benzothiazyl Disulfide	1.5
Zinc Dimethyl Dithiocarbamate	0.5
Rubbermakers Sulfur	4
Total	**383.0**

For extremely high hardness, approximately 5 parts of phenolic resin may be added.

Cure: 6 minutes at 310°F.
Specific Gravity: 1.66
Hardness, Shore A: 96
Color: Light Brown
Mold Release: Good
Hot Tear Resistance: Good
Cost per pound (estimated): $.092

To Satisfy Your Epicurean Taste for

EASE OF PROCESSING
HIGH HARDNESS
ABRASION RESISTANCE

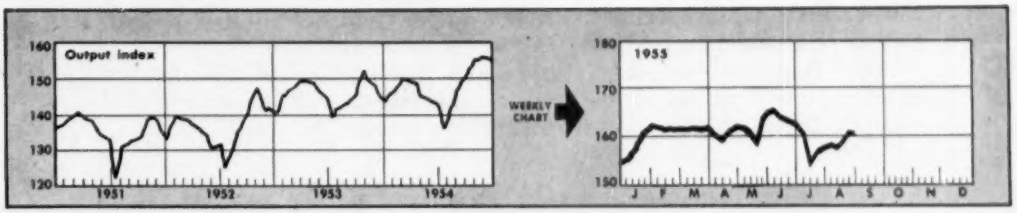
at low cost specify
NEVILLE LX-685,135

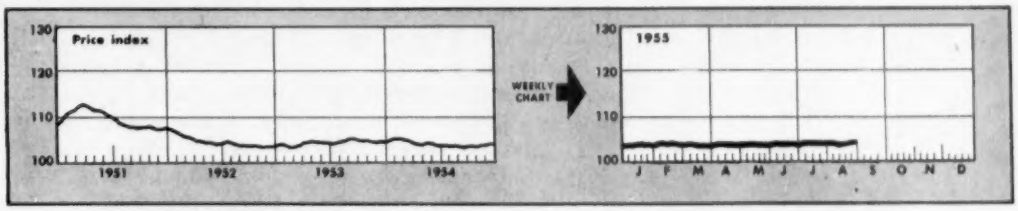
NEVILLE CHEMICAL CO.
PITTSBURGH 25, PA.
Plants at Neville Island, Pa., and Anaheim, Cal.

R-56

NEVILLE

MARKETS . . . . . .





WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947-49=100)	164.2	163.1	148.4
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.5	104.6	104.0
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	487.8	480.7	317.2

MONTHLY INDICATORS—Wholesale Prices (Index 1947-1949=100)	Latest Month	Preceding Month	Year Ago
All Commodities (other than Farm and Foods)	117.4	116.5	114.4
Chemicals and Allied Products	105.9	106.0	106.8
Industrial Chemicals	118.1	118.2	117.4

MARKET LETTER

Price swings, up and down, will this week continue to catch the attention of chemical buyers from coast to coast. There should be a slowing in the frequency of such changes, though, come the turn of the quarter next week when many new contract quotes go into effect.

Latest slated to make an Oct. 1 pivot is a group of chlorinated solvents including carbon tetrachloride, methylene chloride, and methyl chloroform.

•

Carbon tet, for instance, will move up ½¢/lb. (for the second time this year), to set a technical tank-car price of 9½¢/lb. east of the Rockies. Another feature of the change announcement: a one-price system for all buyers will be established. Until now some schedules have been different for distributors and for direct consumers.

•

Methylene chloride will henceforth be available in only a technical grade. Most makers are eliminating the lesser-quality paint remover grade, and will post new prices, effective next week, to both spot and contract consumers.

The upcoming technical methylene chloride listings: in tank cars, 11¼¢/lb.; c.l., 12½¢; l.c.l. 15¢/lb.

•

Users of some styrenes may soon be convinced it'll pay to give up a long-standing practice of picking up their purchases at the producers' plant, have their material shipped. Dow, for one, will offer the inducement of lower tank-car prices on its N99 and H99 polymer grades of monomers.

COOPERATION ALL THE WAY

But while the tank reductions will be ½¢/lb. (from 21¢ down to 20½¢), c.l. and l.c.l. quantities are going to cost ¼¢/lb. more.

Dow's rubber-grade styrene and its vinyltoluene, though, will be immediately cut across the board. Tank tags are dropping from 18¢ down to 17¢/lb.; lesser-quantity reductions amount to ¼¢/lb.

•

Elemental boron consumers will benefit from the payoff of Pacific Coast Borax's two-and-a-half-year research work aimed toward production of a high-grade product at a low enough price to move it from a lab curiosity to status of an industrial chemical.

Small scale manufacture is just now getting under way, and the company will post prices on two grades of amorphous boron. A low grade will sell in the $10-13/lb. range, and the target-achieved high grade of 95-97% will be tagged $12-15/lb. Both scales are for volume shipments of 2,000 lbs. or more, but sample and test quantities are being offered at somewhat higher prices.

•

Interested in nitroparaffin derivatives? If so, you can now get bulk quantities of nitromethane from Commercial Solvent's "first-in-the-world full-scale production facilities" at Sterlington, La. Fact is the first railroad tank car of nitromethane was turned out and shipped this month.

•

On the other hand, if you want to sell some soda ash, note that Argentina (via the Argentine Central Bank) is in the market for some 30,000 tons. At least half of the soda is to be delivered by Nov. 30.

Until two years ago importation of the material posed no problem—except that of prompt remuneration to the seller—but since then the bank has set up regulations providing that:

- Purchases are to be made from the lowest bidder;
- An importing firm must be exclusive representative of the producer;
- Importers must be previously established in the soda import trade.

With most U.S. producers straining to fill all orders right here, it's doubtful whether many will be able to pay much attention to the South American request.

•

To the north, Canada is underscoring some prosperity-tinted statistics of its lumber industry. Increase in pulp and paper production was the primary cause of a $16-million boost in British Columbia's '54 lumber production. And for the first time paper output exceeded 600,000 tons—a near-50,000-ton hike over the previous year.

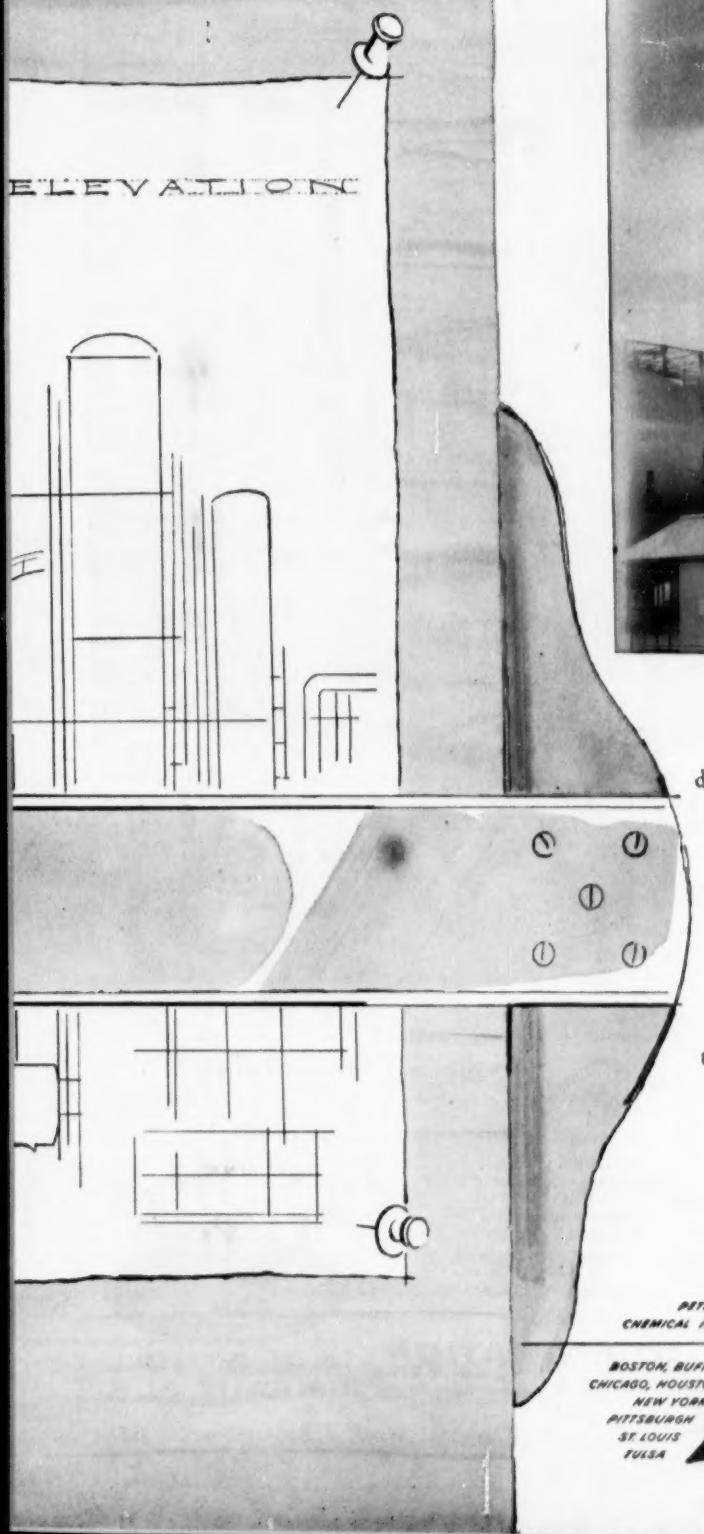
SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending September 19, 1955

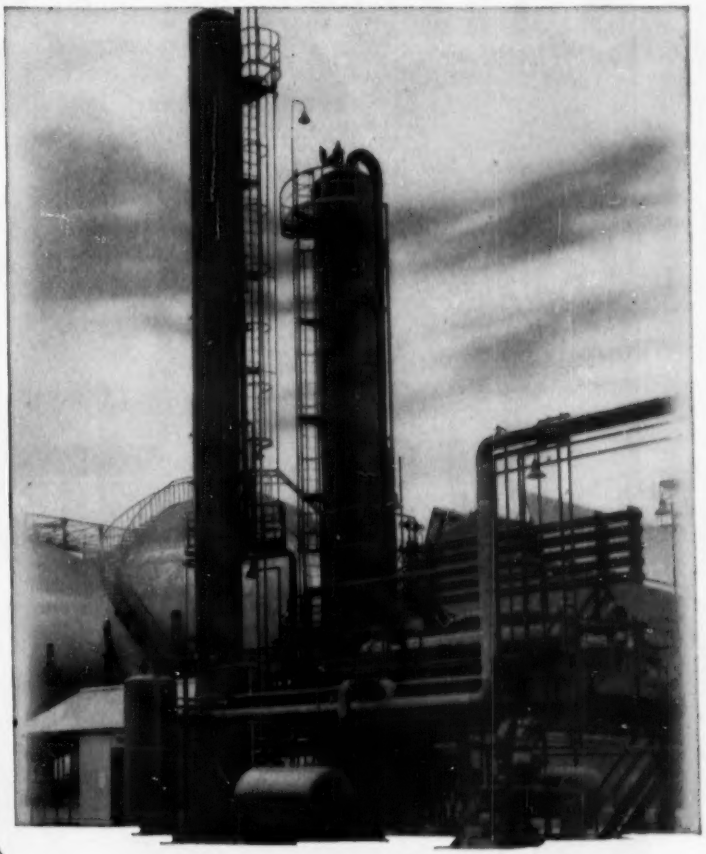
	Change	New Price		Change	New Price
UP					
Alumina, calcined, bgs., c.l., wks.	$ 0.004	$ 0.0425	Antimony trichloride, anhyd., solid, pails, c.l., wks.	$ 0.025	$ 0.41
Aluminum hydrate, heavy, bgs., c.l., frt. equald.	0.001	0.0295	Monoethylamine 70%, contained amine, dms., c.l., dlvd. E.	0.02	0.35
DOWN					
Stannic oxide, dms., dlvd. E.	$ 0.02	$ 0.98	Vinyltoluene, tks., frt. alld.	$ 0.01	$ 0.18

All prices per pound unless quantity is stated.

COOPERATION ALL THE WAY

from drawing board to reality!





There's a vital factor in a successful chemical plant installation. Cooperation between Pritchard designers, engineers and construction superintendents and your staff is invaluable to you. It insures that the varied skills and abilities of Pritchard personnel in effecting efficient facilities for many varied chemical processes will produce the installation *you* need *when* you need it.

No installation, large or small, fails to receive this basic attribute of a successful contract from Pritchard.

Remember this the next time you build or expand. Contact Pritchard *first*.

INDUSTRY'S PARTNER FOR PROGRESS

SERVING THE GAS, POWER, PETROLEUM AND CHEMICAL INDUSTRIES

BOSTON, BUFFALO CHICAGO, HOUSTON NEW YORK PITTSBURGH ST. LOUIS TULSA

J.F. Pritchard & Co.

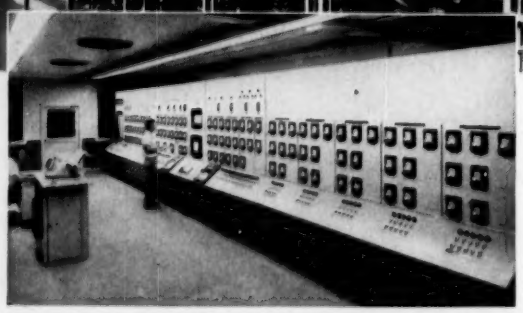
ENGINEERS • CONSTRUCTORS

Dept. 476, 4625 Roanoke Parkway, Kansas City 12, Mo.

NITROPARAFFINS on Stream!

WORLD'S FIRST COMMERCIAL NITROPARAFFIN PLANT NOW IN PRODUCTION

Shipments are now being made from Commercial Solvents Corporation's new plant at Sterlington, Louisiana. Completely designed by CSC engineers, the new plant marks a major step in the company's long-term petrochemical development. The new facilities will produce over 10 million pounds of four basic nitroparaffins – Nitromethane, Nitroethane, 1-Nitropropane, and 2-Nitropropane. In addition, the new plant will turn out multi-million pound quantities of the derivatives listed at right, many of which have achieved outstanding industrial usefulness. This unique family of chemicals opens up entirely new fields with extraordinary potential for all industry.



Control panel contains over 100 miniature recorders and controllers. A unique data reduction unit continually scans and records all operating conditions.

BASIC NITROPARAFFINS

Nitromethane Nitroethane 1-Nitropropane 2-Nitropropane

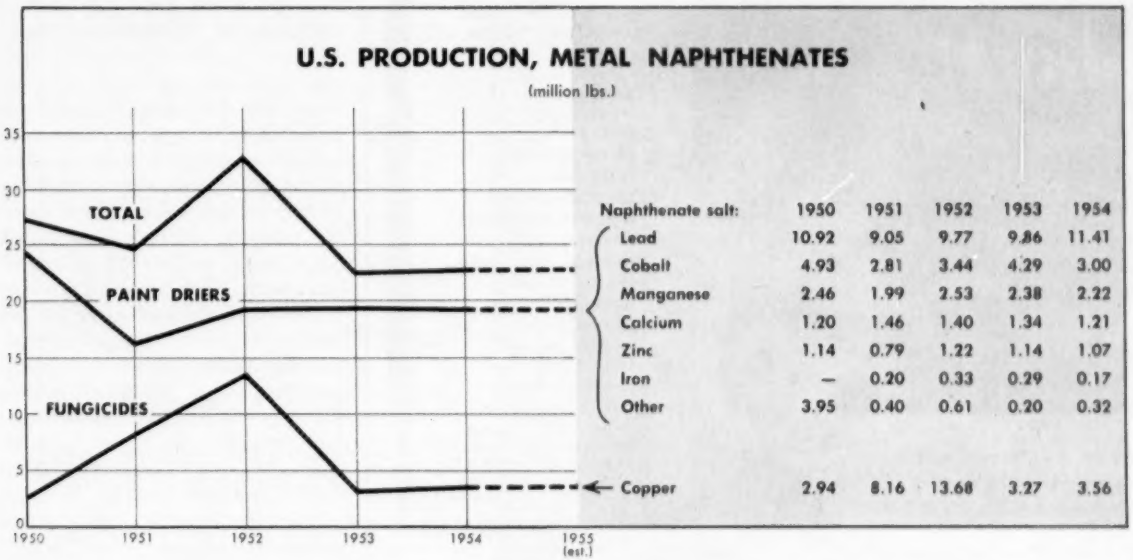
NITROPARAFFIN DERIVATIVES

Alkaterges
Aminohydroxy Compounds (AMP; AMPD)
Chloronitroparaffins
Diamines
Hydroxylamine Salts (HAS; HS)
Nitrohydroxy Compounds

For full technical data and samples, write to:

COMMERCIAL SOLVENTS CORPORATION
260 MADISON AVENUE, NEW YORK 16, N. Y.

CSC INDUSTRIAL CHEMICALS



Naphthenate salt:	1950	1951	1952	1953	1954
Lead	10.92	9.05	9.77	9.86	11.41
Cobalt	4.93	2.81	3.44	4.29	3.00
Manganese	2.46	1.99	2.53	2.38	2.22
Calcium	1.20	1.46	1.40	1.34	1.21
Zinc	1.14	0.79	1.22	1.14	1.07
Iron	—	0.20	0.33	0.29	0.17
Other	3.95	0.40	0.61	0.20	0.32
Copper	2.94	8.16	13.68	3.27	3.56

Rough Market on the Wane?

U.S. paint industry is well on the way to breaking sales records, but paradoxically, the paint drier business appears to be heading for the bottom of the barrel.

Consumption of old-line naphthenates, in particular, will undergo further buffeting by fast-moving competitors.

This year's record-breaking sales figures will underline the U.S. paint industry's "in the pink" condition. But some segments of the business—naphthenate driers, for one—nonetheless face a future tinged with blue.

Paint men will converge Oct. 31 on the nation's capital for the National Paint, Varnish and Lacquer Assn.'s 67th annual convention. The theme: "Color Comes to Washington."

But while color will be highlighted, there's no doubt many will be discussing the sad outlook for driers, particularly the old-line naphthenates.

The metal naphthenates are notorious, of course, for their erratic supply/demand fluctuations — gyrations with every change of raw material availability, and radical shifts in end-use patterns during periods of national emergency.

For example, as recently as 1952, the total U.S. naphthenate production surged from the previous year's 24.9 million lbs. to 33 million, then as quickly slumped to 22.8 million in the year following. Since 1953, production has remained at pretty even keel.

At first glance, this stabilized production rate may create the illusion of a revitalized market, yet it actually implies that naphthenate driers have not been keeping pace with the general increase in paint production; this, in turn, further implies that naphthenate consumption is definitely on the downgrade. In the future, say naphthenate producers, the downward trend will be greatly accelerated.

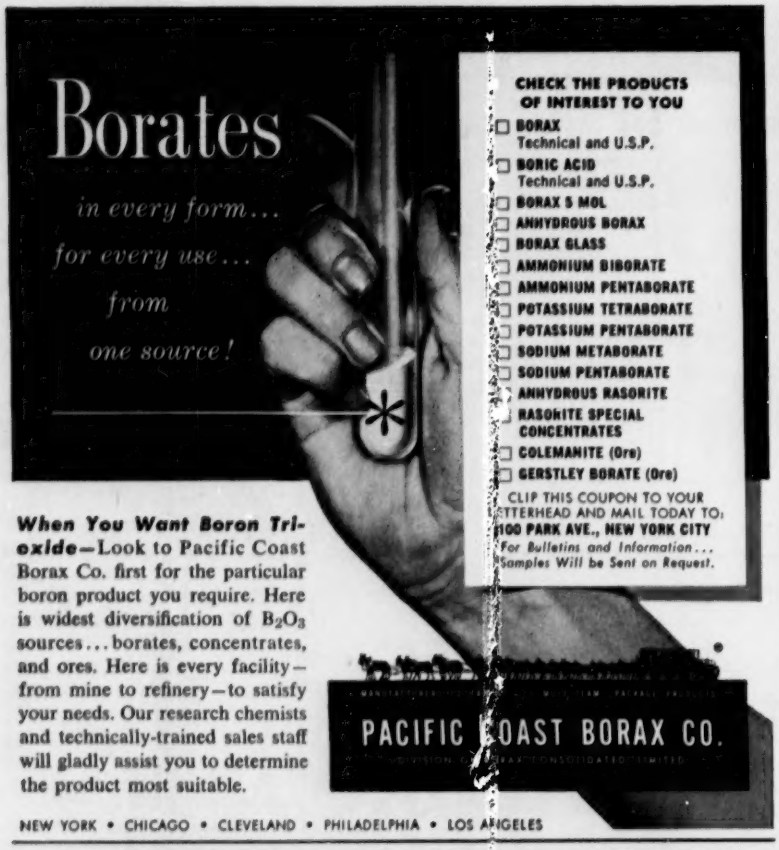
Tall Oil Tangent: Partly responsible for these developments are competitive materials, notably the tallates. Developed as alternates for naphthenates, whose production slumped in 1951, tallates provided a convenient stop-gap substitute; production jumped from 3.7 million lbs. in 1950 to 11.9 million lbs. in 1951. However, partial recovery of naphthenate production by 1952 drove tallates back down to 4.9 million lbs.

Full impact of the potential competitive force of tallates on naphthenates is still prevented by government specifications that prohibit the presence of even minute amounts of rosin acids in government-approved driers. If these rigid requirements are relaxed—because of the persistent efforts of tall oil producers—tallates could well develop into a naphthenate nemesis.

Whether or not specification changes will open the flood-gates, tall oil-derived driers will nonetheless exert considerable pressure on the naphthenate market; no longer merely convenient emergency substitutes, tallates have won a permanent corner of the drier business, will be fighting hard to garner even more of the profits.

Also competitive are the metal salts of 2-ethyl-l-hexoic acid (alpha-ethyl caproic acid), but their 1.5-million-lbs./year total production provokes little worry among naphthenate producers. Slanted toward use in the manufacture of so-called "odorless" paints, the hexoic acid salts hold a small part of the total drier market, largely because of their relatively high prices. Yet price cuts would offer no simple remedy for their trailing consumption because naphthenates — derived from cheap petroleum by-products—could meet the challenge with ease.

Shift to Emulsion: More important than any of these competitive factors,


Borates
in every form...
for every use...
from
one source!
CHECK THE PRODUCTS OF INTEREST TO YOU
☐ BORAX Technical and U.S.P.
☐ BORIC ACID Technical and U.S.P.
☐ BORAX 5 MOL
☐ ANHYDROUS BORAX
☐ BORAX GLASS
☐ AMMONIUM BIBORATE
☐ AMMONIUM PENTABORATE
☐ POTASSIUM TETRABORATE
☐ POTASSIUM PENTABORATE
☐ SODIUM METABORATE
☐ SODIUM PENTABORATE
☐ ANHYDROUS RASORITE
☐ RASORITE SPECIAL CONCENTRATES
☐ COLEMANITE (Ore)
☐ GERSTLEY BORATE (Ore)
CLIP THIS COUPON TO YOUR LETTERHEAD AND MAIL TODAY TO:
100 PARK AVE., NEW YORK CITY
For Bulletins and Information... Samples Will be Sent on Request.
PACIFIC COAST BORAX CO.

When You Want Boron Trioxide—Look to Pacific Coast Borax Co. first for the particular boron product you require. Here is widest diversification of B_2O_3 sources... borates, concentrates, and ores. Here is every facility—from mine to refinery—to satisfy your needs. Our research chemists and technically-trained sales staff will gladly assist you to determine the product most suitable.

NEW YORK • CHICAGO • CLEVELAND • PHILADELPHIA • LOS ANGELES

High Foaming Sulframin* AB-40 Beads now available in 3 densities

That's right. You can now get SULFRAMIN AB-40 Beads—a sodium alkyl aryl sulfonate, wetting and emulsifying agent of the forty per cent active type—in three densities: .137, .2, .3. All with uniform activity . . . uniform density.

There's a type to fill your retail container best—be it bubble bath, rug shampoo, car wash, or all-purpose cleaner.

Or if you compound, one of these densities can give your finished product the uniform bulk you need. SULFRAMIN AB-40 Beads have high wall strength too, keeping breakdown and dusting to a minimum and will add to the free-flowing properties of your product.

Fill in the coupon below and we'll send you samples. Try it. Then judge for yourself if this isn't the one detergent you've been looking for.

*T. M. Reg. U. S. Pat. Off.

ULTRA CHEMICAL WORKS, INC.
Joliet, Ill. PATERSON, N. J. Hawthorne, Calif.

ULTRA Chemical WORKS

ULTRA CHEMICAL WORKS, INC.
P.O. Box 2150, Dept. , PATERSON, N.J.
Please send samples and quotations on
SULFRAMIN AB-40 BEADS.
Please check ☐ .137 ☐ .2 ☐ .3 density
Name.....
Address.....
City..... State.....

MARKETS . . . . . .

however, is the large-scale shift by consumers to emulsion-type paints. Any inroads that these newer paints will make on oil-base coating materials will materially affect the consumption of all types of paint driers.

Some marketers aver that emulsion paints will provide slight competition so long as they are limited to indoor uses. Reason: relatively small quantities of driers go into indoor-type oil-base paints, thus are not too much influenced by fluctuations in this portion of the market. But others maintain that because some driers do go into these uses, the drier business definitely will be disturbed—when indoor emulsion paints will have had time to capture a larger part of the total indoor paint market.

All agree, however, that a greater threat to naphthenate driers lurks in the development of outdoor-type emulsion paints—such as the polyvinyl acetate materials now "on the way."

Copper Stands Alone: Meanwhile, copper naphthenate lives apart from the other salts. When a national emergency creates a slump in the production of other naphthenates, it is largely due to increased demands on the copper salt for many important military uses, from fungicides to incendiaries.

Peacetime use of copper naphthenate as a fungicide is still 3-4 million lbs./year, and little if any increase is expected in the next few years despite the rapid growth of the fungicide market as a whole. One reason is the success of other types of fungicides, such as pentachlorophenol.

Copper naphthenate, because its fungicide uses constitute only about 10% of the total naphthenate market, remains a minor influence in the overall picture. Attention will be focused on paint driers—which account for at least 50% of all naphthenate uses*—because this important application is most vulnerable to pressure by the changing market situation.

Surprisingly, many producers are not worried about the dark future for naphthenate driers, are busy developing other materials to replace them. Some, in fact, frankly state that they would welcome the complete disappearance of a "tough" market.

* Other naphthenate uses (percentages estimated): lubricants and gear oils, 15%; emulsifiers and de-emulsifiers, 10%; cleaning compounds, 3%; miscellaneous, 7%, of total U.S. consumption.

gambling with flammable solvents?

switch now to Dow's new

CHLOROTHENE

(1,1,1-tricloroethane, inhibited)

***No fire hazard**
***Extremely low toxicity**
***High cleaning power**
***Rapid Dry Time**

Chlorothene is the answer to the search for a cold cleaning solvent that eliminates fire hazard — that does not require heat — that equals carbon "tet" in cleaning power and yet is only $\frac{1}{20}$ as toxic.* Chlorothene has no flash point — no fire point. Chlorothene quickly cleans common metals, including aluminum, with relative safety from corrosion.

Complete lines of solvents including Underwriters' Laboratories Inspected cold cleaning and vapor degreasing solvents are readily available from the local plants listed below. Order by drum, tank truck or tank car. You're sure of speedy service . . . of products from nationally-known suppliers when you call on the Solvents and Chemicals Group.

*M.A.C. 500 p.p.m.

THE SOLVENTS and CHEMICALS GROUP

2540 West Flournoy Street, Chicago 12, Illinois

Amsco Solvents & Chemicals Co.
4619 Reading Road—Elmhurst 4700
Cincinnati 29, Ohio

Buffalo Solvents & Chemicals Corp.
Box 73, Station B—Bedford 1572
Buffalo 7, New York

Central Solvents & Chemicals Co.
2540 West Flournoy Street—SExley 3-0505
Chicago 12, Illinois

Dixie Solvents & Chemicals Co.
Dixie Highway at Appleton Lane—Atwood 5828
Louisville 16, Kentucky

Hoosier Solvents & Chemicals Corp.
1650 Luett Ave.—MElrose 8-1361—Indianapolis 22, Ind. Nelson Road East—Anthony 0213—Fort Wayne 8, Ind.

Missouri Solvents & Chemicals Co.
419 De Soto Ave.—GArfield 1-3495
St. Louis 7, Missouri

Ohio Solvents & Chemicals Co.
3470 W. 140th St.—CLearwater 1-3770
Cleveland 11, Ohio

Southern Solvents & Chemicals Corp.
1354 Jefferson Highway, P. O. Box 4067, Carrollton Station—Temple 4666
New Orleans 18, Louisiana

Texas Solvents & Chemicals Co.
8501 Market Street—Orchard 6683
Houston 15, Texas

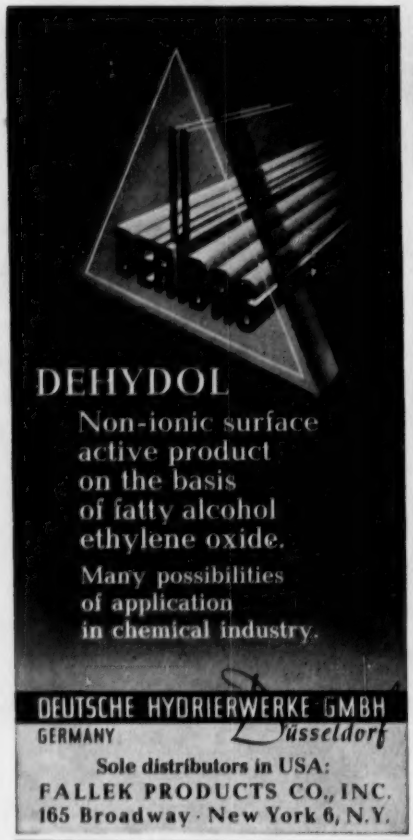
Western Solvents & Chemicals Co.
6472 Selkirk Ave.—WAlnut 1-6350
Detroit 11, Michigan

Western Solvents & Chemicals Co.
Central Ave. at Reynolds Road—Jarden 0761
Toledo 8, Ohio

Western Solvents & Chemicals Co. (Canada) Ltd.
1454 Crawford St.—CLearwater 2-0933
Windsor, Ontario

Wisconsin Solvents & Chemicals Corp.
1719 South 83rd St.—GReenfield 6-2630
Milwaukee, Wisconsin

Wolverine Solvents & Chemicals Co.
1500 Century Ave., S. W. —CHerry 5-9111
Grand Rapids, Michigan


DEHYDOL
Non-ionic surface active product on the basis of fatty alcohol ethylene oxide.
Many possibilities of application in chemical industry.
DEUTSCHE HYDRIERWERKE GMBH
GERMANY
Düsseldorf
Sole distributors in USA:
FALLEK PRODUCTS CO., INC.
165 Broadway · New York 6, N.Y.

Synthetics Do It Again

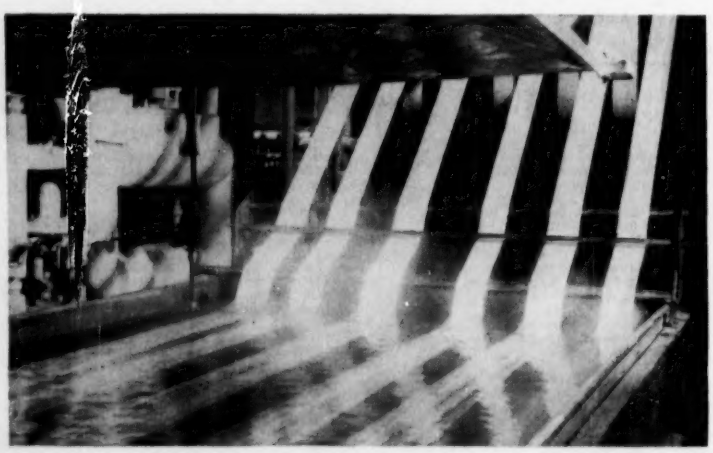
TO DATE synthetic fibers have managed to pick off a number of cotton outlets, have shorn closely some once-exclusively woolen markets. And now ambitious man-made fiber makers are casting a calculating collective eye on the domain traditionally held by furs.

Newly developed pile fabrics made of Union Carbide and Carbon's Dynel and Du Pont's Orlon are combined to produce a soft, luxurious, man-made fur fabric that's proving to be a remarkably reasonable facsimile of the real thing.

Coats, which are attracting attention of furriers and fur-loving women from Main St. to Park Ave., come close to duplicating a variety of furs—and at a price generally below $100. Many of the fabrics (some backed with cotton, some with Dynel) resemble sheared beaver, mouton, even seal (*above*).

So rapidly have the fur-like materials caught on, that acrylic fiber end-use patterns valid less than a year ago are today being dramatically revised. Some months ago, not more than 20-25% of the 4 million lbs. of Dynel produced (*below*) at the South Charleston, W. Va., plant, was used in women's coats. By the end of the year, a conservative estimate is that Carbide will be diverting more than 50% of its production to pile fabric mills.

And response is sparking plans for expansions. By early spring, Carbide will up Dynel capacity by some 35%; Du Pont, reportedly, will increase Orlon capacity to about 60 million lbs./year in '56.



take a fresh look at...

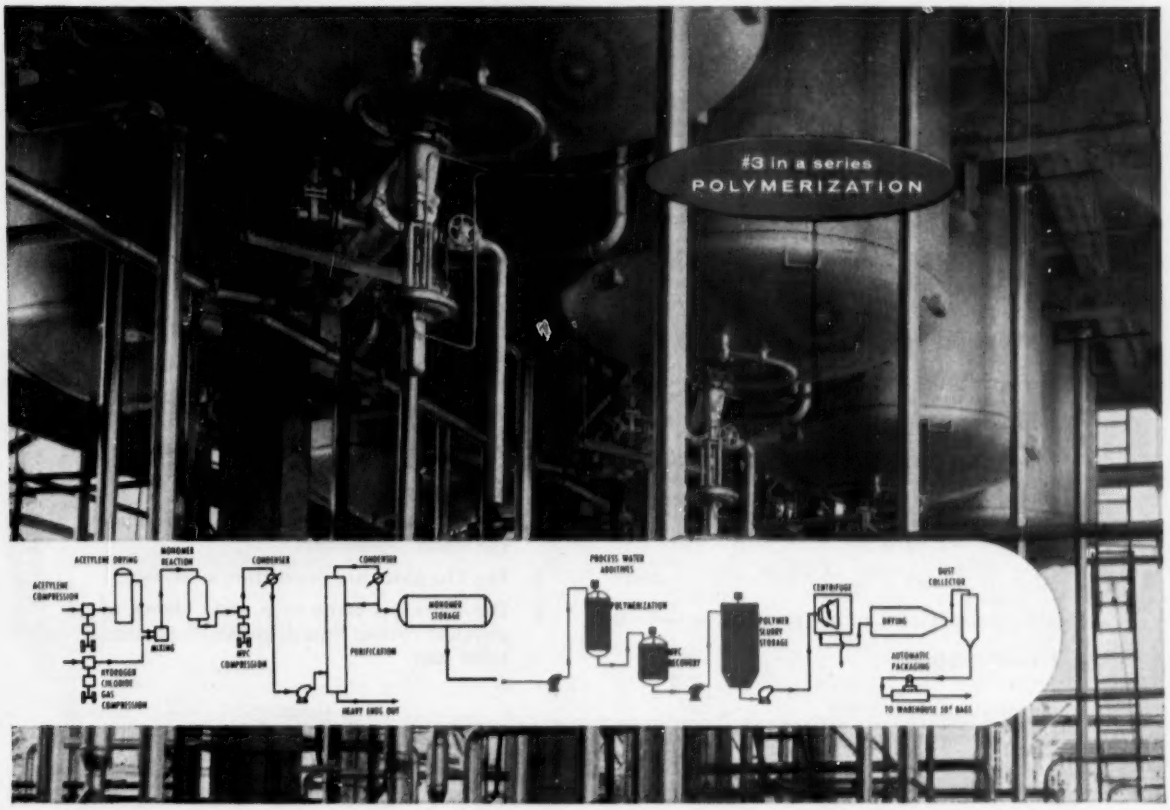
chemical buying

Turn to your BUYERS' GUIDE whenever purchasing problems come along. You'll find it chock-full of the information you need to buy chemicals and process equipment.

Chemical Week *Buyers' Guide*

McGraw-Hill Publishing Company
330 West 42nd Street, New York 36, N. Y.

Another Quality Chemical by General Tire



How quality is built into Vygen*

Here in the heart of the Vygen process, Polymerization, monomer purity is maintained at almost a clinical level. All materials are fed through glass lined reaction kettles under precisely controlled reactor conditions. The resulting polymer is chemically pure.

Because Vygen is free of contaminants, lot to lot reproducibility is maintained and you are assured of consistent fabricating characteristics. In addition, every pound of Vygen polyvinyl chloride resin is backed by production testing on actual fabricating equipment.

For samples and literature write to The General Tire & Rubber Company, Chemical Division, Akron, Ohio.

Chemical Division
GENERAL
THE GENERAL TIRE & RUBBER CO.
VYGEN

*T. M. G. T. & R. Co.

Creating Progress Through Chemistry

General Tire also produces . . .
Gen-Flo* (Paint Latex) • Gen-Tac* (Vinyl Pyridine Latex) • Kure-Blend MT® (Accelerator Masterbatch) • Glykon* (Polyester Resin) • Polystop® (GRS Shortstop) • Ko-Blend® (Insoluble Sulfur Masterbatch)

How Wyandotte's Pluronics help you

Makers of shampoos and other hair preparations are enjoying important benefits from the many advantages offered by the Pluronics—Wyandotte's series of 100%-active nonionic surfactants. For, with the Pluronics, it is possible to select a better balance of desirable properties for a given formulation. Some examples:

1. **The Pluronics are nonirritating to eyes and skin**
2. **The Pluronics provide excellent detergency**
3. **The Pluronics have oil-removal properties which leave the hair soft and manageable**
4. **The Pluronics are compatible with other shampoo ingredients**
5. **The Pluronics are practically odorless**
6. **The Pluronics come in a wide choice of physical forms: liquid, paste, flake, solid cast**

What is so different about the Pluronics?

The Pluronics are a unique series of nonionic surface-active agents, based on a chemical concept not previously used in the synthesis of nonionics. Because of their wide range of properties and grades, they offer extreme flexibility in formulation.

With the Pluronics, it is possible to formulate shampoos and hair preparations varying from low-viscosity liquids to flake forms and solids. For each Pluronic grade – including flake – is 100% active, and contains no diluents or fillers.

With the Pluronics, you can prepare a product to meet almost any molecular weight or hydrophobic-hydrophilic balance. For the Pluronics range in molecular weight from 800 to 8000—compared to 300 to 700 for ordinary surfactants.

The Pluronics are the first commercial example of a block-polymer-type surface-active agent. There is no comparable product on the market. Thus, to fully realize their advantages, you must thoroughly investigate them in your own laboratory.

Evaluate the Pluronics as a basis for an entirely new approach in formulating . . . they may prove the key to compounding concepts that open up new avenues of progress for your company.

Are the Pluronics safe to use?

The Pluronics have an unusually low order of eye irritation. Extensive tests have also shown that the Pluronics are not primary sensitizers for human skin. In fact, because they are nonionic and are neutral in pH, the Pluronics are considerably less irritating to the skin than the ordinary anionic and cationic types of detergents. Generally, they may be used safely by persons with sensitive skin, as well as by those allergic to soap.

What about grease removal?

The grease-removal properties of the Pluronics are directly related to their hydrophobic-hydrophilic balance. Since a series of Pluronics is offered, it is possible to select the Pluronic with exactly the grease-removal properties desired. By leaving the proper amount of hair oil, the Pluronics impart a desirable sheen to the hair, and make it much easier to control immediately after washing. The Pluronics are exceptionally effective, too, in shampoos for dyed hair.

*Report on Wyandotte Pluronics**

formulate better shampoos

Do the Pluronics provide effective detergency?

The objective of shampooing hair, of course, is to remove extraneous soil particles. The Pluronics have exceptional detergency and soil-suspension properties which remove this "dirt" quickly and thoroughly. An important advantage of the Pluronics – as mentioned above – is their ability to perform this function without the unnecessary removal of most of the natural hair oil. And the Pluronics provide good cleaning action, even in hard water.

What about compatibility?

The Pluronics are compatible with all types of products commonly used in shampoos. Being nonionic, the Pluronics are completely compatible with soap and other anionic surfactants, with quaternaries used in dandruff-remover shampoos, and with water of any hardness. In addition, the Pluronics are compatible with auxiliary materials, such as dyes and perfumes—and they may also serve to solubilize some types which have limited water solubility.

Can the Pluronics be combined with high-foaming agents?

Yes. As with grease removal, the lathering properties of the Pluronics are related to their hydrophobic-hydrophilic balance. More hydrophilic members of the series have initial lathering properties approaching those of alkylarylsulfonates. Generally, however, the Pluronics are low foaming. In shampoos where lathering is of prime importance, the Pluronics may be successfully combined with high-foaming agents.

Are the Pluronics used in many other hair-preparation applications?

Because of their wide range of properties and flexibility of formulation, new uses for the Pluronics are being discovered practically every day—and the end is nowhere in sight. Besides their use in standard and specialty shampoos, they are being used in hair tonics, special hair preparations, hair bleaches, sun-tan lotions, stick deodorants, perfumes, shampoo bars for animals —to name just a few.

Send for samples and full data

Call your local Wyandotte representative, or write us direct. We will supply the proper samples of the Pluronics, a data sheet summarizing their physical and surface-active properties, technical information on the use of the Pluronics in shampoos, and prices. Write us today . . . or mail coupon below. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

*REG. U.S. PAT. OFF.

Wyandotte
REG. U.S. PAT. OFF.
CHEMICALS

HEADQUARTERS FOR ALKALIES

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA • CHLORINE
MURIATIC ACID • CALCIUM CARBONATE • CALCIUM CHLORIDE
GLYCOLS • CHLORINATED SOLVENTS • SYNTHETIC DETERGENTS
OTHER ORGANIC AND INORGANIC CHEMICALS

Wyandotte Chemicals Corporation
Inquiry Section CW, Wyandotte, Michigan

Please send:

☐ Data sheet on the use of Pluronics in shampoos
☐ Samples of Pluronic L64 (liquid), F68 (flake) for use in shampoos
☐ Data on Pluronics for (state application): _____
_____
☐ Have your representative call on me

Name _____

Firm _____ Title _____

Address _____

City _____ Zone _____ State _____

How to Ship Chemicals CLEAN, SAFE, SURE ..ALL THE WAY!

It's really simple. Go North American all the way. North American's specialized chemical tank cars transport your products with speed and safety anywhere there's a railroad main line, spur or siding. No contact with metal, no corrosive action, no chance for contamination, you specify the lining and we will obtain it for you . . . your chemicals arrive as clean and pure as you produced them. Specify North American, for chemical bulk shipping at its best.

For Special Products Requiring Special Care

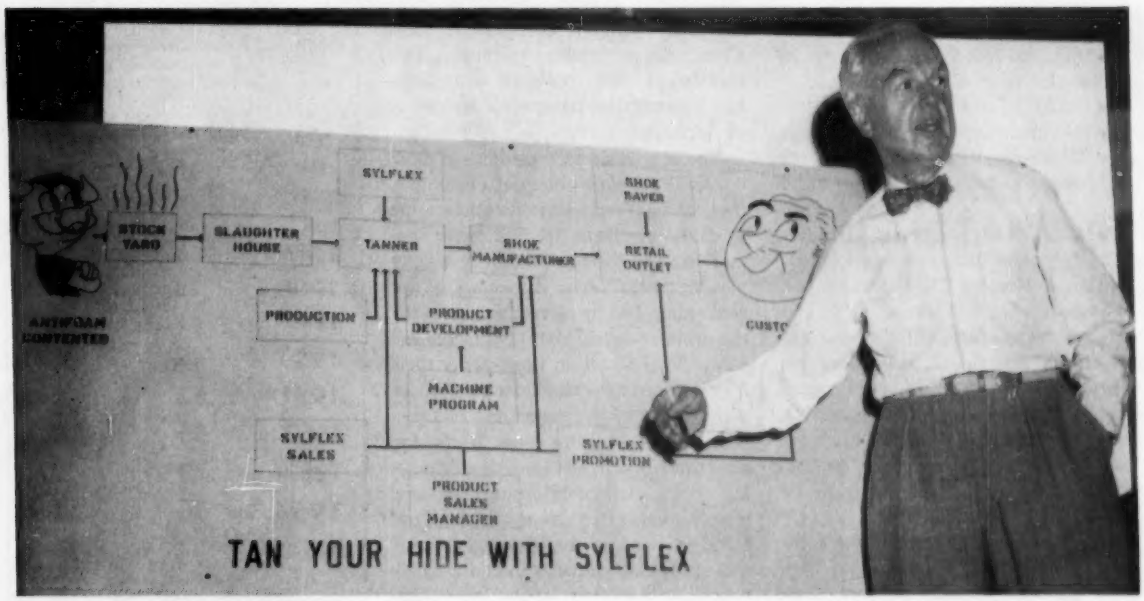
ROOM 1429 KIRBY BUILDING, DALLAS, TEXAS
739 PILLSBURY AVENUE, ST. PAUL 4, MINN.
SHELL BUILDING, ST. LOUIS 3, MO.
91 SOUTH MAIN STREET, FOND DU LAC, WIS.
681 MARKET STREET, SAN FRANCISCO 5, CALIF.
60 EAST 42ND STREET, NEW YORK 17, N. Y.
341 KENNEDY BUILDING, TULSA, OKLA.

NORTH AMERICAN CAR CORPORATION

NORTH WESTERN REFRIGERATOR LINE COMPANY

231 South LaSalle Street, Chicago 4, Illinois

A NATIONWIDE ORGANIZATION WITH BRANCH OFFICES IN IMPORTANT MARKET CENTERS



DOW CORNING'S COLLINGS: Technical men aim at the market, and . . .

Silicones Reap an Award

The steady advance of the chemical engineer into the world of marketing came into focus this week with the announcement that Dow Corning Corp. (Midland, Mich.) had won the 1955 Chemical Engineering Achievement Award for its successful commercial development of silicones.

The award, sponsored since 1833 by CHEMICAL ENGINEERING, is made biennially, will be presented to the company at a dinner in Philadelphia on Dec. 7.

Professor Walter Whitman, chairman of the 84-man award committee and head of the chemical engineering department of Massachusetts Institute of Technology, points out that this is the first time the award has been made for the participation of chemical engineers in a commercial development project.

The award-winning project centered largely about the firm's need to market its wartime silicones. The company turned to its chemical engineers and technical specialists to do the job.

Result: Dow Corning has, in 12 years, brought to fruition the commercial applications of 200 silicone products, raised gross monthly sales from $15,000 to over $2 million, and reduced its prices some 40%.

The development story harks back to the years prior to World War II when silicones were still in the research stage. In those days Corning Glass Works (Corning, N. Y.) was tackling the task of combining organic materials with glass. The work was generally disheartening, except for the discovery of some materials with interesting properties—among them thermal stability, oxidation-resistance.

These were the properties the electrical industry was seeking for a bonding resin that could be used with glass fiber as a high-temperature electrical insulator. Research at Mellon Institute, where Corning had established a fellowship, brought forth a series of silicone fluids that also had the same properties; moreover, it came up with what looked like a process to make them. Corning felt it could develop the resin.

Mutual Exchange: In 1937, Corning approached Dow Chemical Co. (Midland, Mich.) with its ideas. Dow's know-how with the Grignard reaction promised a workable manufacturing process. Application research at Dow, meanwhile, had come up with the first use for silicone fluid: temperature and dielectric properties made it an ideal material for an ignition sealing compound in military aircraft.

The discovery prompted the Army Air Corps to ask for all the product that could be made, and the two companies joined forces to manufacture. In Feb. '43 they formed Dow Corning, an equally owned company, with Corning's Eugene Sullivan as president and Dow's William Collings as executive vice-president and general manager.

For three years the new company produced in volume, but with end of the war the bottom fell out, and 1946 came along with no military orders and no commercial applications sufficient to maintain business.

At this point the people of Dow Corning turned their thoughts to marketing. The problem: Where could the unusual properties of silicones be of greatest use?

Technical men delved into evaluating the product in a multitude of new applications, educating potential customers in the uses of them. The customers too, suggested ideas. What came out of this effort established Dow Corning silicones. Among the achievements:

- Silicone rubber — capable of

standing up better than organic rubbers under extreme temperature conditions.

- Silicone defoamers.
- Silicone-based insulations to increase electric motor capacities.
- Mold release fluids.
- Nonflammable hydraulic fluids.
- Water-repellents—useful in fabric, paper, masonry and leather finishing.
- Vehicles for paints and varnishes.

Such contributions were not happenstance. Because Dow Corning, unlike most chemical firms, is a producer of finished or semifinished goods, its efforts are valueless until results are tested and proved in specific uses. Furthermore, silicones are expensive, often costing several times as much per pound as the materials they replace. Their economic advantages must be sold.

To accomplish these ends the company uses its technical men, for they have the technological understanding to establish product usefulness from an engineering as well as an economic point of view. Many of its chemical engineers and chemists are actively engaged as product development engineers and as technical sales representatives.

Knowledge in Action: These men are key people in the development philosophy. No longer do salesmen work with persuasiveness alone; instead they apply their technical knowledge to recognize potential areas in industry where silicones may be used. They are required not only to see the problems of potential customers, but also to comprehend how a new market may require changes in Dow Corning's processing methods. This translation from problem to process has fostered the company's technique of technical teamwork.

The idea is simple: working in close cooperation with potential customers, the technical representatives determine what the problems are and make suggestions for their solution. A simple answer, more often than not, is not available. The project then goes to the product development engineers for study. These men, in turn, apply their training to start with silicone polymers and create end products.

Currently, hundreds of ideas for new uses of silicones—many originating from customers' questions—are b ing investigated in a dozen Dow Corning product engineering laboratories. Making silicones in commercial quantities is but part of the job; fitting them economically to specific needs becomes the remainder.

Dow Corning has girded for the job by staffing itself with chemical engineers. Not stopping at the 20% par for most chemical companies, it has run its chemical engineers up to better than 40% of its technically trained staff; chemists and chemical engineers represent over half of the sales department, 90% of the product engineering group.

These men steer a practical course. Although much research is under way, the bulk of it is applied research—specifically aimed at paying off. The goal: develop more silicone products to answer the needs of the market.

In the 12 years since its inception the company has had a yearly average growth rate of 40%, jumped its gross monthly sales a hundredfold, and begun marketing 200 silicone products, 50 of them within the last three years.

For such vindication of an engineer-manned sales development program —a coveted award.

SEVENFOLD GROWTH IN ELEVEN YEARS

(Chemists and Chemical Engineers in Market Research, Sales, and Product Engineering)

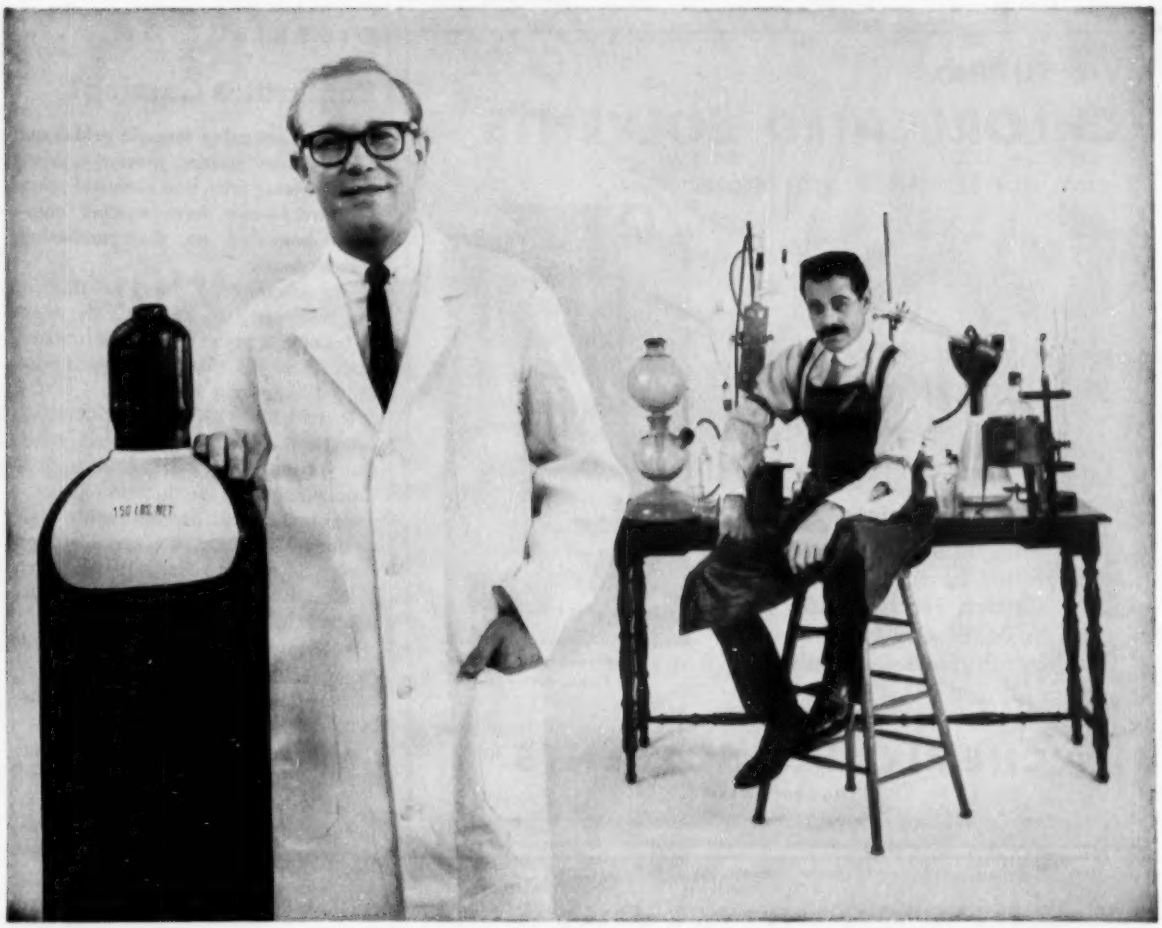
Year	No.	% Total Employment
1944	14	11.2
1945	15	8.6
1946	26	10.3
1947	**30**	**8.1**
1948	**38**	**7.6**
1949	**41**	**8.7**
1950	**42**	**7.2**
1951	**53**	**6.8**
1952	**65**	**7.1**
1953	**75**	**7.1**
1954	**96**	**8.9**
1955	**97**	**8.3**

Polyethylene Goes Underground

FARMERS are hearing salesmen's knocks these days as Carlon Products Corp. (Cleveland), maker of polyethylene flexible plastic tubing, sets about demonstrating its system of substituting the tubing for clay tiling drainage material.

Marketed through an irrigation distributor, the tubing is basically perforated polyethylene pipe containing 12 holes per foot set at 120° angles to one another. Different hole sizes and spacing are made available depending on earth and water conditions.

Sales angles: tubing may usually be laid by a one-step tractor operation using a subsoiler, or mole plow, to dig a trench and lay the pipe in continuous sections through a guide; tractor method often eliminates need of closing trenches; costs of putting down ordinary 5-in. clay tile are reduced 26-70% with flexible tubing; plastic pipe comes in variety of sizes and wall thicknesses, is light and durable.



We can apply 40 years experience to help solve your Sulfur Dioxide problem

The chemist in the background (above) dates us—August of 1915 to be exact. This was the month and year we shipped our first cylinder of liquid sulfur dioxide.

A good deal of our energies during the past 40 years have been devoted to perfecting a quality-control system for the manufacture of sulfur dioxide. Today, we are supplying our customers a near 100 percent pure grade (99.9%) of this chemical.

Equally important, to our way of thinking (our customers' too), has been the growth of our service facilities. Over the years we have been privileged to serve and instruct a host of industries in the economical application of sulfur dioxide. This background of diversified experience is available for your use.

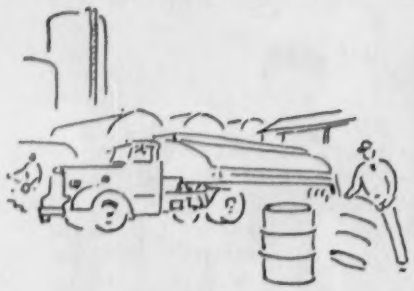
Special problems involving sulfur dioxide, those relating to new or unusual uses, receive special attention in our research laboratories. So if your chemical process includes bleaching, acidifying, purifying, fumigating, reducing, or preserving, investigate the advantages of using Ansul liquid sulfur dioxide. Write ANSUL CHEMICAL COMPANY, Dept. C-14, Industrial Chemicals Division, Marinette, Wisconsin.

ANSUL

WE SUPPLY

CHLORINATED SOLVENTS

from our *NEWARK* warehouse



ALCOHOLS
KETONES
ESTERS
GLYCOL ETHERS
PLASTICIZERS
CHLORINATED SOLVENTS
GLYCOLS
AMINES
AROMATIC SOLVENTS
ALIPHATIC NAPHTHAS

Ethylene Dichloride
Propylene Dichloride
Methylene Chloride, Tech. & P.R.G.
Carbon Tetrachloride
Trichlorethylene
Perchlorethylene — "Vythene"*

* Registered Trade Mark

THE CP CHEMICAL SOLVENTS INCORPORATED

60 PARK PLACE, NEWARK 2, NEW JERSEY — MArket 2-3650 WOrth 2-7763

ORGANIC PEROXIDES

LUPERSOL® DDM

60% METHYL ETHYL KETONE PEROXIDE IN DIMETHYL PHTHALATE

WATER WHITE LIQUID

11% ACTIVE OXYGEN

LOW TEMPERATURE CATALYST FOR POLYESTER RESINS

WAREHOUSE STOCKS CONVENIENTLY LOCATED THROUGHOUT THE COUNTRY

*REGISTERED TRADE MARK

LUCIDOL DIVISION
WALLACE & TIERNAN INCORPORATED
BUFFALO 5, NEW YORK

DISTRIBUTION . . .

Fumarates Coming?

Customers using fumaric acid—and that includes plastics, protective coatings, printing inks, and chemical manufacturers—now have another company pounding on the purchasing agents' doors.

The chemical division of Borden Co. disclosed its intention this week to become a prime vendor of fumaric acid, fumarates, dibasic acids and possibly dibasic acid salts.

Right now, Borden is offering fumaric acid, dibutyl, dioctyl, and diallyl fumarate in works-lot quantity. Semicommercial production of succinic, malic, and aconitic acids also is under way and it's possible that citric acid will be added within a year.

Sales interest in the fumarates is popping up all over the industry:

- Monsanto has dibutyl fumarate in semicommercial production, reports a "strong interest" in other esters.
- Pfizer, already manufacturing dimethyl fumarate, is currently evaluating other fumarates.
- Rubber Corp. of America and Hatco are distributing samples of fumaric acid and its esters, and Hatco is producing fumaric acid commercially.

Major reason for the widespread activity in fumarates stems from its potential as a comonomer that produces nonmigratory, internal plasticization in polyvinyl acetate and polyvinyl chloride polymers. And, sales of vinyl and vinyl copolymer resins scaled record heights last year: about 514 million lbs. valued at $211 million.

Just what the company's detailed plans are to market dibasic acids and fumarates, Borden won't say. But company spokesmen claim that planned fumaric production capacity will be as great as anyone's in the industry, hint that an "efficient" process will support competitive pricing.

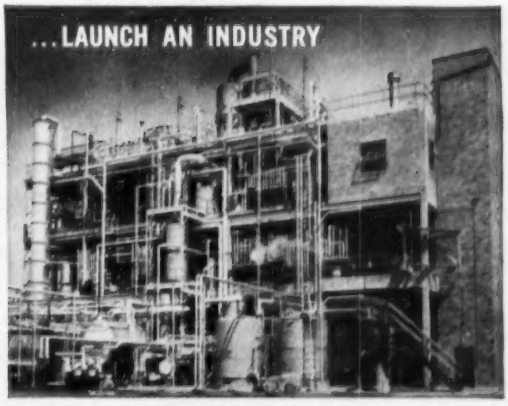
Borden itself won't ferment fumaric. Instead, the firm will market the dibasic acids and esters for the Bzura Chemical Co. (Next year, Bzura hopes to bring a long-planned Puerto Rican plant onstream. Process: molasses fermentation.)

With vigorous interest in fumarates, and fumaric production mounting, some red-hot sales battles could be just around the corner.

HOW HERCULES HELPS...

EXCITING NEW DISHES AND CUTLERY, both molded with a new Hercules plastic, Hercocel® W, are as durable as they are beautiful. A product of Hercules research, Hercocel W is a low-cost thermoplastic combining high heat resistance and good dimensional stability with exceptional toughness and impact strength. (Tranquil ware dishes by Byrd Plastics, Inc.; cutlery by Royal Brand Cutlery Company, a Division of National Silver Company, Brooklyn, New York.)

HANDY CONTAINERS and display rack for Hercules smokeless powders work two ways—they make it easier for the sportsmen who do their own loading to select the right powder, and convenient for the dealer to arrange an eye-catching display. Hercules powders have long been the favorite with handloaders who want accuracy and economy.



A MILLION POUND A MONTH PLANT is now producing dimethyl terephthalate at Burlington, N. J. Largest single user: Canadian Industries (1954) Ltd., in the synthetic fiber 'Terylene'. Hercules' plant, first to make DMT by air oxidation, is designed to expand as markets grow.

HERCULES POWDER COMPANY
INCORPORATED
992 Market St., Wilmington 99, Del. Sales Offices in Principal Cities
SYNTHETIC RESINS, CELLULOSE PRODUCTS, CHEMICAL COTTON, TERPENE CHEMICALS, ROSIN AND ROSIN DERIVATIVES, CHLORINATED PRODUCTS, OXYCHEMICALS, EXPLOSIVES, AND OTHER CHEMICAL PROCESSING MATERIALS.

G55-9

HERCULES
CHEMICAL MATERIALS FOR INDUSTRY

tracers . . . to opportunities in the

MANAGEMENT SERVICES

ENGINEERING CORPORATION OF AMERICA

Chemical & Petro-Chem Process Plants
Industrial Waste Treatment Projects
Air Pollution Abatement
Special Mechanical & Process Equipment

205 Grove Street Westfield, N. J.
Westfield 2-7117

JOHN J. HARTE CO.

Engineers • Constructors

Chemical • Process • Industrial
Petro • Fertilizer • Pulp & Paper
Water • Wastes • Material Handling

284 Techwood Dr., Atlanta, Ga.
New York • Washington • Foreign

THE C. W. NOFSINGER COMPANY

Personalized Engineering Service
PETROLEUM REFINING AND CHEMICAL INDUSTRIES

• Surveys—Planning—Process Design
• Engineering Design—Drafting—Procurement
• Supervision of Construction and Operation

906 Grand Avenue, Kansas City 6, Missouri

JAMES P. O'DONNELL

Engineers

Professional Engineering for the Petroleum and Process Industries

39 Broadway Bowie Bldg.
New York City Beaumont, Texas

SIRRINE

ENGINEERS

Plant Design & Surveys covering Chemical Electrochemical and Metallurgical Production; Industrial Waste Disposal; Water Supply & Treatment; Analysis & Reports

J. E. SIRRINE CO.
Greenville South Carolina

TECHNICAL ENTERPRISES, Inc.

Engineers—Consultants—Chemists
to
Chemical—Food—Pharmaceutical Industries
Complete Engineering Services
Product & Process Research & Development
SPECIALISTS IN
SMALLER MANUFACTURING PLANTS
31 South St., New York 4, N. Y. WH 3-1544

ROGER WILLIAMS

Technical & Economic Services, Inc.
• ENGINEERING ECONOMICS
• MARKET RESEARCH
• PRODUCT EVALUATION
Write for "Profit Evolution"
148 East 38th Street, New York City 16
Murray Hill 5-5257

Wisconsin Alumni Research Foundation

Project Research Consultation and Production Control Services in Biochemistry, Chemistry, Bacteriology, Pharmacology, and Insecticide Testing and Screening.

Write for price schedule

Wisconsin Alumni Research Foundation
P.O. Box 2059-G • Madison 1, Wisconsin

WURSTER & SANGER, INC.

Chemical Engineers

Consulting service in operating, process or equipment problems.
New plant design or modernization

GLYCERINE—FATTY ACIDS—EDIBLE OILS
cable: WURSANCHEM

5201 S. Kenwood Ave., Dept. 11, Chicago 15, Ill.

EMPLOYMENT

RESEARCH CHEMISTS

- POLYMERS
- SURFACE COATINGS
- PAPER COATINGS
- ADHESIVES
- MOLDINGS
- TEXTILES

Leading national vinyl resins company of N.E. in midst of dynamic multi-million dollar expansion period has openings in Exploratory and Applications Research for B.S., M.S. and Ph.D. chemists with 0-7 years' experience. Remarkable personal advancement opportunities for those who wish to grow with a medium-sized company on the way up. All replies confidential. Send resume and salary desired to

P-7700 CHEMICAL WEEK
330 W. 42 St., New York 36, N. Y.

CHEMICAL MARKET RESEARCH

Our expanding consulting service to the chemical process industries means we have openings for young chemists and/or chemical engineers who are looking ahead. No market research training is necessary but some industrial experience is indicated plus an active interest in the economic and marketing phases of the chemical process industries. Obviously training or experience in market research would be valuable

Roger Williams Technical & Economic Services, Inc.
148 East 38th Street, New York 16, New York
Murray Hill 5-5257

WANTED

MARKET RESEARCH
ANALYST

Position requires background knowledge of organic chemistry and interest in chemical economics—up to five years—experience in market research or technical sales preferred but not required. If interested send resume and salary requirements to:

Industrial Relation Division,
SOHIO CHEMICAL CO.,
First Lima Bldg.,
LIMA, OHIO

OPPORTUNITY

CHEMICAL ENGINEER

Expanding chemical engineering department has an opportunity for a man interested in the design of experimental and production machinery for manufacture of new products. Six to eight years experience in process design and project engineering work preferred. Cost estimation experience particularly helpful. Present line of products include pressure-sensitive adhesive tapes, abrasives, reflective compounds, graphic products, adhesive and coatings, reinforced plastics and chemicals. Location in St. Paul, Minnesota provides easy access to outstanding hunting and fishing areas. Advancement based upon individual merit. Starting salary based upon education and experience. Men interested in individual technical responsibility write—

Minnesota Mining & Manufacturing Co.,
Technical Employment Dept.,
900 Fauquier St.,
St. Paul 6, Minn.

Wanted

ORGANIC CHEMIST

Positions open in Petrochemical Plant laboratory located on Texas Gulf Coast. B.S. or M.S. Degree. 2-5 years of experience.

Response should include resumé of background and experience.

CELANESE CORPORATION OF AMERICA
Personnel Department
Post Office Box 428
Bishop, Texas

Midwest States Territory

Chemical Sales Opportunity

Large national corporation engaged in primary production of industrial and agricultural chemicals. Prefer man experienced in executive type selling with appropriate technical background and schooling. Unique opportunity for properly qualified individual in extremely interesting and diverse chemicals sales promotion and development. Position requires initiative, self supervision and extensive travel. Salary commensurate with experience, all traveling expenses and late model car furnished. Write fully to:

SW 7520 Chemical Week
330 W. 42nd St., New York 36, N. Y.

chemical process industries

EMPLOYMENT

WANTED

CHEMISTS:

Establishing full scale research group.

Ph.D.'s:

Organic

Inorganic

Electro

Analytical

M.S. and B.S. for:

Members of research group.

B.S. for:

Control and Analytical problems.

Will occupy new and modern research laboratory November, 1956. Located in fast growing Ohio River Valley chemical center

P-7743 CHEMICAL WEEK
330 W. 42 St., New York 36, N.Y.

Selling Opportunity Offered

Resin and plastic salesman desired by prime manufacturer of resins and injection molding compounds. Eastern territory, company automobile, all expenses paid, salary and bonus. Prior successful sales experience essential. Excellent opportunity. SW-7607, Chemical Week.

Position Wanted

Technical sales/service chemical engineer. 7 years experience chemical & plastic specialties. Family, 29. PW-7752, Chemical Week.

EQUIPMENT--used-surplus

For Sale

Bowen 5' dia. Stainless Steel Spray Dryer, Perry Equip., 1415 N. 6th St., Phila. 22, Pa.

Oliver Continuous Panel Type Filters, 5'3" dia. x 8' face, 130 sq. ft., st. st. spray nozzles and water headers. Gas tight hoods and gas tight repulpers. Excellent condition. Perry Equip., 1415 N. 6th St., Phila. 22, Pa.

Patterson Fdry. 6" dia. x 8' long. "DJ" Jacketed Steel Ball Mill, 40 HP Expl. Pr. Motor. Unused. Perry Equip., 1415 N. 6th St., Phila. 22, Pa.

CHEMICALS WANTED

BUYERS OF SURPLUS

CHEMICALS—OILS—SOLVENTS
DRUGS—RESINS—WAXES
PLASTICS—COLOR—ETC.

BARCLAY CHEMICAL COMPANY, INC.
75 Varick Street New York 13, N. Y.
WORTH 4-5120

SURPLUS WANTED

CHEMICALS, PHARMACEUTICALS, OILS
PLASTICIZERS, RESINS, DYES
SOLVENTS, PIGMENTS, ETC.

CHEMICAL SERVICE CORPORATION
96-02 Beaver Street, New York 5, N. Y.
HAnover 2-6970

SURPLUS WANTED

Chemicals—Resins—Pigments—Solvents
By-products—Mixtures
Specializing in off spec materials

CHEMSOL, INC.
70 Dod Street, Elizabeth, N. J., EL 4-7654

CHEMICALS OFFERED

FOR SALE

FATTY ACIDS
ESTERS ALCOHOLS
Highly Purified — Kilogram Quantities
Applied Science Laboratories, Inc.
140 N. Barnard St., State College, Pa.
Phone AD 8-6282

SPECIAL SERVICES

Truland Chemical & Engineering Co., Inc.

AVAILABLE

CUSTOM REFINING FACILITIES

- Complete Distillation Service • Distillations
- Extractions • Fractionations Drum Lots—Tank Cars

WANTED

- All types of Crude Mixtures
- By-Products, Residues, Wastes
- Contaminated Solvents

Truland Chemical & Engineering Co., Inc.
Box 426, Union, N. J. Murdock 6-5252

CUSTOM SPRAY DRYING

- **LIMITED OR VOLUME PRODUCTION**
- **MINIMUM COSTS**
- **20 YEARS EXPERIENCE**

SPRAY DRYING SERVICE, INC.
501 North Avenue, Garwood, New Jersey
Phone: Westfield, N. J. 2-1829

BUSINESS OPPORTUNITIES

Chemical specialty manufacturing business, new, NYC, industrial accounts only. Partnership or sale, $12-25,000. BO-7727, Chemical Week.

MISCELLANEOUS

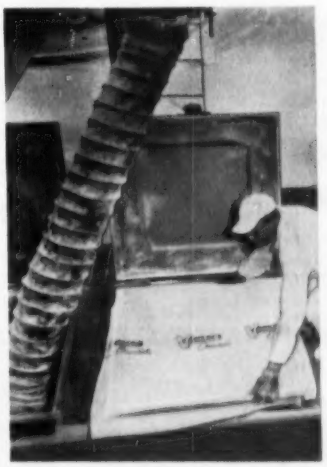
Books and Periodicals

Bought and Sold-Complete sets, short runs, and single volumes of scientific periodicals—in all languages. Walter J. Johnson, Inc., 125 East 23rd St., New York 10, N. Y.

DISTRIBUTION. . . .

For Tomorrow's Reference: Activated alumina—data sheet provides detailed technical description of the product, suggests applications in gas drying, defluoridating water, and in controlling the neutralization number and sludge in turbine oil. Reynolds Metals Co. (Louisville, Ky.).

• Polyethylene—8-p. technical bulletin offers data on polyethylene use in rubber compounding. Typical formu-



Sales Hatching

YOU MAY MAKE a few sales of contaminated chemicals, but if dirt, cinders, moisture or other impurities keep filtering into your products in transit, trouble could be brewing. One source of such contamination, loose-fitting hatches on hopper freight cars, won't be plaguing one chemical company much longer. Victor Chemical Works (Chicago) thinks it's solved its phosphate shipment problem with a special paper covering (*see cut*). Made of strong crinkled (to supply stretch) duplex paper laminated by a water-resistant adhesive, the 40-in.-sq. cover is placed over the hatch opening, fastened by the hatch cover, and discarded after use. Two Victor plants are now using the paper covers; other plants will soon follow suit. The cover can double as an advertising medium—and Victor has emblazoned its logotype across the paper.

lations and physical data on the finished product are included. Semet-Solvay Division, Allied Chemical & Dye Corp. (New York).

• Acrylic esters—technical booklet furnishes information on the physical and chemical properties, reactions, bibliography, shipping, polymerization and applications of ethyl, n-butyl, 2-ethylbutyl, and 2-ethylhexyl acrylate. Carbide and Carbon Chemicals Co. (New York).

• Thermosetting molding compounds—4-p. folder gives partial listing of various physical constants for company's brand of urea, melamine, and alkyd resins. Barrett Division, Allied Chemical & Dye Corp. (New York).

•

Expanding Sales Coverage: Chas. Pfizer & Co. (Brooklyn) will put up a new $1-million warehouse and office building in Chicago. Of two-story design, the structure will provide 81,000 sq. ft. of space and a special air-conditioned chamber for heat-sensitive materials.

• National Lead Co.'s Baroid Division (New York) will install an 11-acre tide-level distribution center on the east side of the Port of New Orlean's Industrial Canal. Docks, bulkheads, and storage facilities will provide for the handling of oil well drilling and chemical materials.

CHEMICAL WEEK • ADVERTISERS INDEX

September 24, 1955

AIR PRODUCTS, INC. 35
Agency—Kenyon & Eckhardt, Inc.
ALLIED ASPHALT & MINERAL CORP. 64
Agency—Cayton, Inc.
ALUMINIUM LTD. SALES, INC. 95
Agency—J. Walter Thompson Co.
AMERICAN MINERAL SPIRITS CO. ... 28-29
Agency—Leo Burnett Co.
ANSUL CHEMICAL CO. 115
Agency—Kenyon & Eckhardt, Inc.
ANTARA CHEMICALS DIV., GENERAL ANILINE & FILM CORP. 57
Agency—The House of J. Hayden Twiss
ARMOUR & CO. 66-69
Agency—Foote, Cone & Belding, Inc.
BAKER & ADAMSON PRODUCTS, GENERAL CHEMICAL DIV., ALLIED CHEMICAL & DYE CORP. ..... 3rd Cover
Agency—Atherton & Currier, Inc.
BARRETT DIV., ALLIED CHEMICAL & DYE CORP. 53
Agency—McCann-Erickson, Inc.
BARNEBEY-CHENEY CO. 94
Agency—Byer & Bowman Adv.
BECKMAN INSTRUMENTS, INC. 43
Agency—Darwin H. Clark Co.
CARBIDE & CARBON CHEMICALS CO., DIV. OF UNION CARBIDE & CARBON CORP. 21
Agency—J. M. Mathes, Inc.
CELANESE CORP. OF AMERICA 97
Agency—Ellington & Co., Inc.
CHEMICAL MANUFACTURING CO. 96
Agency—G. M. Basford Co.
CHEMICAL SOLVENTS INC., THE C. P. 116
COLUMBIA-SOUTHERN CHEMICAL CORP. 91
Agency—Ketchum, MacLeod & Grove, Inc.
COMMERCIAL SOLVENTS CORP. 104
Agency—Fuller & Smith & Ross, Inc.
CONSUMERS POWER CO. 6
Agency—Commonwealth Services, Inc.
CONTINENTAL CAN CO. 77
Agency—Batten, Barton, Durstine & Osborn, Inc.
COOPER ALLOY CORP. 32
Agency—Mahool Adv., Inc.
CORN PRODUCTS REFINING CORP. 73
Agency—The House of J. Hayden Twiss
COSDEN PETROLEUM CORP. 12
Agency—Craig & Webster Adv.
DAVENPORT MACHINE & FOUNDRY CO. 86
Agency—Bawden Bros., Inc.
DAY CO., INC., THE 66
Agency—Strauchen & McKim, Adv.
DEHYDAG, Deutsche Hydrierwerke, GmbH. 108
Agency—Linder Presse Union, GmbH
DORR-OLIVER INC. 24
Agency—Sutherland-Abbott Adv.
DOW CHEMICAL CO., THE 27, 85
Agency—MacManus, John & Adams, Inc.
DU PONT DE NEMOURS & CO., INC. E. I., POLYCHEMICALS DEPT. 58-62
Agency—Batten, Barton, Durstine & Osborn, Inc.
ENJAY CO., INC. 89
Agency—McCann-Erickson, Inc.
ETHYL CORP. 41
Agency—H. B. Humphrey, Alley & Richards Inc.
EVANS RESEARCH & DEVELOPMENT CORP. 58
Agency—Ritter, Sanford & Price, Inc.
FEDERATED METALS DIV., AMERICAN SMELTING & REFINING CO. 88
Agency—John Mather Lupton Co.
FERGUSON CO., THE H. K. 82
Agency—The Bayless-Kerr Co.
FISHER CHEMICAL CO., INC. 8
Agency—G. M. Basford Co.
FOOD MACHINERY & CHEMICAL CORP. CHEMICAL DIV. 72
Agency—James J. MacMahon, Inc.
FULTON BAG & COTTON MILLS 15
Agency—Fitzgerald Adv. Agency
GENERAL AMERICAN TRANSPORTATION CORP., WIGGINS GASHOLDER DIV. ... 75
Agency—Weiss & Geller, Inc.
GENERAL ANILINE & FILM CORP. 71
Agency—L. W. Frohlich & Co.
GENERAL ELECTRIC CO. 39
Agency—Benton-Bowles, Inc.
GENERAL TIRE & RUBBER CO. 101
Agency—D'Arcy Adv. Co.
GIRDLER CO., THE 25
Agency—The Griswold-Eshleman Co.
GROSS & CO., A. 38
Agency—G. M. Basford Co.
HALL CO., THE C. P. 76
Agency—Cruttenden & Eger, Assoc.
HARCHEM DIV., WALLACE & TIERNAN, INC. 92
Agency—Branstater Assoc., Inc.
HERCULES POWDER CO. 117
Agency—Fuller & Smith & Ross, Inc.
HESS TERMINAL CORP. 98
Agency—Mahool Adv. Inc.
HUDSON PULP & PAPER CO. 23
Agency—Lewin, Williams & Saylor, Inc.
KOPPERS CO. 47
Agency—Batten, Barton, Durstine & Osborn, Inc.
LUCIDOL DIV., WALLACE & TIERNAN, INC. 116
Agency—Landsheft & Barber, Inc.
MARATHON CORP. 84
Agency Cormack-Imse-Beaumont Adv.
METAL HYDRIDES, INC. 76
Agency—Creamer-Trowbridge Co.
MICHIGAN CHEMICAL CORP. 99
Agency—Wesley Aves & Assoc., Inc.
MISSOURI DIV. OF RESOURCES & DEVELOPMENT 42
Agency—R. J. Potts-Calkins & Holden, Inc.
MONSANTO CHEMICAL CO. 10-11
Agency—Gardner Adv. Co.
NATIONAL STARCH PRODUCTS, INC. ... 78
Agency—G. M. Basford Co.
NEVILLE CHEMICAL CO. 100
Agency—William Cohen Adv.
NITROGEN DIV., ALLIED CHEMICAL & DYE CORP. 81
Agency—Atherton & Currier, Inc.
NOPCO CHEMICAL CO. 87
Agency—Lewin, Williams & Saylor, Inc.
NORTH AMERICAN CAR CORP. 112
Agency—Doremus & Co.
OLIN MATHIESON CHEMICAL CORP. 2nd Cover
Agency—Doyle, Kitchen & McCormack, Inc.
PACIFIC COAST BORAX CO. 106
Agency—Howard M. Irwin & Assoc.
PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. 31
Agency—Walker & Downing Adv.
PENNSYLVANIA SALT MFG. CO. 7
Agency—Geare-Marston Adv.
PERMUTIT CO., THE 9
Agency—Cunningham & Walsh, Inc.
PFAUDLER CO., THE 97
Agency—Charles L. Rumrill & Co., Inc.
POWELL CO., THE WILLIAM 2
Agency—The Ralph H. Jones Co.
PRITCHARD & CO., J. F. 103
Agency—Carter Adv. Agency
PUBLICKER CHEMICAL CORP. 4-5
Agency—Al Paul Lefton Co.
REFINED PRODUCTS CORP. 16
Agency—James Cirillo Adv.
SEMET SOLVAY PETROCHEMICAL DIV. ALLIED CHEMICAL & DYE CORP. 55
Agency—Atherton & Currier, Inc.
SHIPPERS' CARLINE CORP. 83
Agency—French & Preston, Inc.
SINCLAIR CHEMICALS, INC. 33
Agency—Morey, Humm & Johnstone, Inc.
SOLVENTS & CHEMICAL GROUP 107
Agency—Weiss & Geller, Inc.
SONNEBORN SONS, INC., L. 67
Agency—St. George & Keyes, Inc.
SOUTHERN STATES IRON ROOFING CO. 40
Agency—George & Glover, Adv.
ULTRA CHEMICAL CO. 108
Agency—Hazard Adv. Co.
UNION BAY STATE CHEMICAL CO., INC. 74
Agency—Tippet & Co., Inc.
UTAH POWER & LIGHT CO. 1
Agency—Gillham Adv. Agency
WIGTON-ABBOTT CORP. 94
Agency—Lee-Stockman, Inc.
WITCO CHEMICAL CO. ..... 4th Cover
Agency—Hazard Adv. Co.
WYANDOTTE CHEMICAL CORP. 65, 110-111
Agency—Brooke, Smith, French & Dorrance, Inc.

tracers SECTION

(Classified Advertising)

H. E. Hilty, Mgr.

BUSINESS OPPORTUNITIES 119
CHEMICALS: Offered/Wanted 119
EMPLOYMENT ..... 118 & 119
EQUIPMENT: Used/Surplus New For Sale 119
Wanted 119
MANAGEMENT SERVICES 118
MISCELLANEOUS 119
SPECIAL SERVICES 119

ADVERTISING STAFF

Atlanta 3 ..... William D. Lanier, 1321 Rhodes-Haverty Bldg., Walnut 5778-2383

Boston 16 ..... 350 Park Square Building Hubbard 2-7160

Chicago 11 ..... Alfred D. Becker, Jr., Francis E. Stewart, 520 N. Michigan Ave. Mohawk 4-5800

Cleveland 15 ..... Vaughn K. Dissette, 1510 Hanna Bldg., Superior 7000

Dallas 1 ..... James Cash, First National Bank Bldg., Prospect 7-5064

Detroit 26 ..... 856 Penobscot Bldg., Woodward 2-1793

Los Angeles 17 William C. Woolston, 1111 Wilshire Blvd., Madison 6-4323

New York 36 ..... Knox Armstrong H. L. Brown, L. Charles Todaro, Charles F. Onasch, 330 West 42 St., LOngacre 4-3000

Philadelphia 3 ..... William B. Hannum, Jr., Architects Bldg., 17th & Sansom Sts., RIttenhouse 6-0670

Pittsburgh 22 ..... 919 Oliver Bldg., Atlantic 1-4707

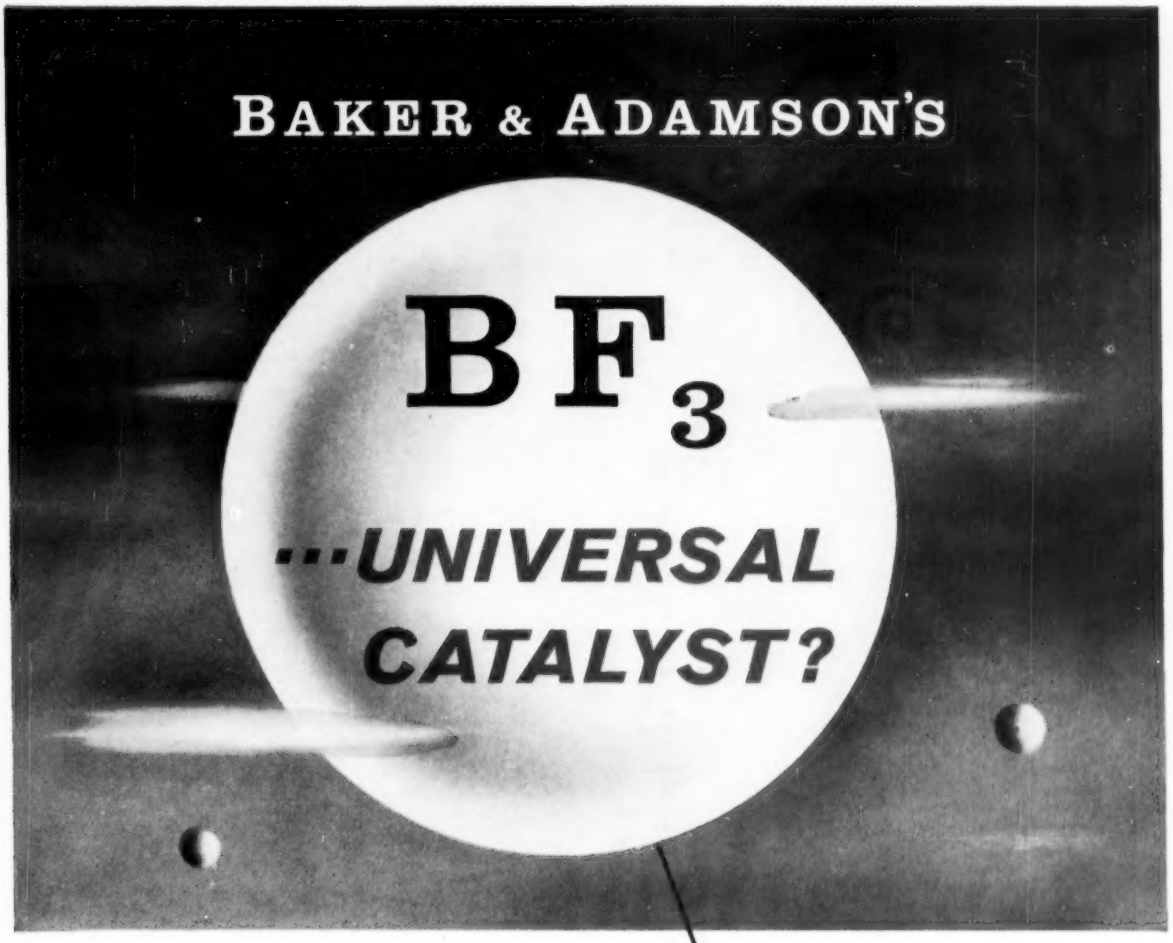
San Francisco 4 ..... T. Evans Wyckoff, 68 Post St., Douglas 2-4600

St. Louis 8 ..... 3615 Olive St., Continental Bldg., Lucas 4867

BAKER & ADAMSON'S

BF_3

...UNIVERSAL CATALYST?



VERSATILE Boron Trifluoride has rung the bell as a catalyst so many times . . . has "carried through" so many different organic syntheses . . . that some chemical engineers are beginning to think of BF_3 as almost universal in its applications.

THE NEXT synthesis problem it will help solve may well be *yours.* Write today for more detailed information on the properties and some of the uses of Baker & Adamson Boron Trifluoride and its complexes.

For
Polymerization
Alkylation
Esterification
Acylation
And Many Other Reactions

FINE CHEMICALS
B·A
REAGENTS

BAKER & ADAMSON® *Fine Chemicals*
GENERAL CHEMICAL DIVISION, ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Please send me further information on Boron Trifluoride

☐ I would like general information on the properties and uses of Boron Trifluoride

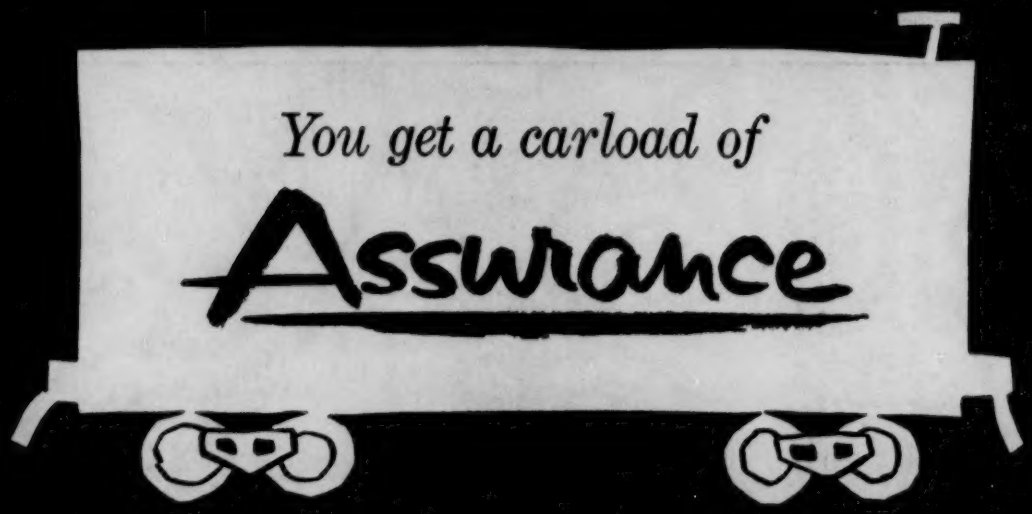
☐ I would like specialized information on Boron Trifluoride for the following use:

Name _____

Company _____

Address _____

City _____ Zone ____ State _____



with every pound of

WITCO STEARATES

FOR GREASES

FOR COSMETICS AND PHARMACEUTICALS

FOR PLASTICS

FOR PAINTS, VARNISHES AND LACQUERS

FOR RUBBER

Among the many stearates produced by Witco:

Aluminum (medium to extremely high gel), Barium, Lithium, Lithium Hydroxy, Calcium, Magnesium, Sodium, Cadmium, Zinc (regular and special grades)... plus many other stearates especially developed by Witco for specific uses in a host of industries.

Write for Stearates Bulletin 53-1, samples or technical service.

WITCO

35 Years of Growth

More and more manufacturers are turning to Witco for their stearate requirements, because Witco gives them something extra. That something extra is assurance – and it comes right along with every stearate order that Witco delivers...

Assurance 1: Stearates supplied by Witco are manufactured in one of Witco's own plants, sold directly to the consumer by the producer.

Assurance 2: Witco's unsurpassed quality control guarantees purity and uniformity. A Witco stearate will give dependable repeat performance in any particular application.

Assurance 3: Technical service by Witco's experts is yours for the asking–service grounded in Witco's long and varied experience with stearates of every grade and type. If a stearate problem crops up, Witco will answer your call with prompt, efficient assistance.

WITCO CHEMICAL COMPANY

122 East 42nd Street, New York 17, New York

Chicago • Boston • Cleveland • Akron • Atlanta • Houston • Los Angeles
San Francisco • London and Manchester, England